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PREFATORY NOTE.

THE gratifying demands made throughout the country for carefully prepared Geographical Readers may properly call for a few suggestions in reference to the best way of using them. The Picturesque Readers were not made merely for the amusement of pupils, but especially to interest and instruct. They should be used, then, as a regular and serious means of imparting information. In order to obtain the most benefit from the books, they should not always be used in the poorest part of the day, — the last half-hour, — nor when it is cloudy, nor on Monday morning or Friday afternoon. They seem to deserve as good an opportunity as the arithmetic, the history, or the writing-book.

The Readers should always be used *with* the regular geography or atlas, and not in place of it. The large and fuller maps found in those text-books should be opened upon the pupils' desks; the wall-maps should be hung up, and all these maps frequently consulted as the lessons are read.

These supplementary Readers can be wisely used by the teacher for Language lessons. Several such lessons have been outlined in different parts of the volume by way of suggestion; others will readily present themselves to the teacher's mind.

The pupils should be encouraged to write stories in connection with the pictures found in the book, especially such pictures as those on pages 5, 8, 20, 46, 61, 81, 96, 103, 113, 130, 153, 160, 162, 168, 170, 175, etc. The pupils may be asked to give oral abstracts of the lesson read, to name the pictures seen, or to write the best single word to suggest the story in the chapter; they may also be encouraged to draw or make as many of the illustrations as they can.

The pupils should be required when they read to give the very best expression, the dialogue form having been retained for this purpose. Each child should be supplied with a book, in order to study and enjoy the pictures. The new words in a lesson should at once be pronounced and explained, to prevent hesitation and loss of interest. The First Book of the Picturesque Readers is designed for the third and fourth years, the Second Book for the fifth and sixth years, in school life.

In the Appendix will be found a very valuable article contributed by Prof. Henry R. Russell. By following the simple directions there given a most excellent Solar Camera can be made by any teacher or pupil without costing over six dollars.

The illustrations are classified in order in the sub-heads in the table of contents. An Index is added for the benefit of teachers and older readers.

The author's acknowledgments for valuable material used in the preparation of this volume are due to so many writers that their names and books are given in the Appendix.

These volumes when finished will contain all the "essentials of geography" in so compact and vivid a form that each book can be easily read by the average child, in school or at home, in a few weeks. Judging from experiments already made in numerous schools, it is believed that what is here read will be easily remembered, because the children are so deeply interested in the story and the illustrations.

THE AUTHOR.

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THIS CONTINENT OF OURS.

LESSON I.

A FROZEN REGION.

ONE Friday night about the middle of January the cold in Lake View was intense. It was, however, the evening agreed upon by the Cartmell family for the next talk, with the help of the *magic lantern*, which was a present to the children at Christmas time.

"It is so cold, Papa," said Nellie, the youngest member of the Travelling Club, "I am afraid Miss Gray will not come."

"Well, suppose your teacher is not here," suggested Mr. Cartmell.

"Oh, that would be too bad!" exclaimed Nellie.

"I would rather wait another week than have my teacher absent," said Florence, Nellie's sister.

"Who will tell us about some of the pictures, if she does not come?" inquired their brother Fred, who had quite a practical turn of mind.

Mr. Cartmell waited till all had expressed themselves, and then said that he was glad to learn how much they loved and respected Miss Gray. On that account he would harness Old Charley into the sleigh, and while George was getting his lantern, pictures, and screen ready, he and Fred would go to Cousin Amy's after Miss Gray.

In half an hour Miss Gray walked into the study, and was happily greeted by the children and Mrs. Cartmell.

"Did you think," the teacher asked, with a smile, "I was afraid to come on account of the cold?"

"I hoped not," said Nellie.

"I would not miss the Travelling Club for cold or hunger. I was just getting ready to walk over when your father and Fred drove up to the house. I was glad to see them, because the sleigh is warmer than the cold snow such an evening as this, but nothing except sickness shall keep me away from these pleasant and profitable meetings."

When all had gathered in the cheerful study, and George, the oldest son, said that he was ready to show the pictures, the electric lights were turned out, and Mr. Cartmell began by saying: —

"The state of the weather outside suggests for our talk this evening that part of our own land sometimes called **A Frozen Region.**"

"Two weeks ago we studied 'A Cold Country.' Do you remember the name of the country, Nellie?"

"Greenland," replied Nellie, promptly.

"Where is it situated?"

"In the northeastern part of North America," Fred answered.

Each square is one thousand miles.

Then George threw upon the screen a map of the grand division commonly called the *continent* of North America.

"You all notice," remarked Mr. Cartmell, "the general triangular shape of the grand division we are to study this winter. It is much wider at the north than at the south; its length from north to south, according to the squares, is

a distance of five thousand miles. A great projection, or jutting out, on one side has a companion projection on another side; a large bay on the north is matched by a great gulf on the south; an extensive group of islands at one side is balanced by another equally extensive group on the opposite side.

SUMMER IN THE ARCTIC REGIONS.

"If you study the details of the map in respect to capes, isthmuses, mountains, plains, and rivers, more of these remarkable comparisons may be found.

"North America is surrounded by three great oceans. How many oceans are there in the world, Nellie?"

"My teacher says that the sea is divided into five oceans."

"Florence may name them in some order, if she can do so."

"Named in the order of their size," promptly re-

sponded Florence, "they are the Pacific, Atlantic, Indian, Antarctic, and Arctic."

"You are correct, Florence. We study first the one you mentioned last. The Arctic is the smallest, only one seventh the size of the Atlantic. It is almost entirely surrounded by the great land bodies of North America

STOPPED BY THE ICE.

and Eurasia. It is a landlocked body of water. Great rivers flow into it from America and Asia. It has thousands of miles of shore and many large islands; but few people sail over its surface, or bathe at any time of the year in its pure waters. Can any one tell why?"

"Because," said Fred, "it is so cold there."

"There are indications on every hand of the severe cold weather. Even in summer ice is seen floating about in every bay and strait.

"It covers both the land and the water.

"The advance of ships in the Arctic Ocean is constantly interrupted, even in August, by great floes, or large fields of floating ice. Frequently the ship is attached to a floe to prevent its being crushed by other moving floes of ice.

"Thick ice begins to form in September. By spring this is thrown up into hummocks of every shape and size. The thickness of ice off the mouth of the Mackenzie River

A BAY IN SUMMER.

has been sometimes over seventy feet. In other parts of the Polar Sea it has been known to be over one hundred feet thick.

"Can Nellie tell us how the natives travel over the ice?"

"Yes, Papa, I have found something.

"About six dogs are usually attached by separate lines to one sledge. It is no easy matter to drive them at first. When starting, each dog is generally seen to be pulling in a different direction. It is often necessary for some friend to urge the dogs on with a piece of meat.

"The dogs are always hungry, for they are poorly fed. The owner gives them very little to eat because he has very little food for himself and family. His wife feeds

them as often as she can. When they are ill, she lets them lie down in the hut, and takes care of them. The dogs are very fond of their mistress, and will follow her anywhere. Sometimes the husband cannot harness his dogs unless the wife comes out and helps, for they will come when she calls.

AMATEUR DOG-DRIVER.

"After struggling for a while, a new pack of dogs are quite apt to obtain their own way, notwithstanding the free use of the big whip. Then the dogs seem to take delight in dragging the riders through as many water-pools as possible.

"When travelling on smooth ice, dogs will draw a sledge eighty or more miles in a day. But oftentimes the smooth ice is crossed by great hummocks which have to be cleared away with pick-axes."

HUMMOCKS IN THE WAY.

"The cold is frequently so intense," said Fred, "in these far northern countries, that if the beard and moustaches are worn, the moisture from the breath settles on them and quickly forms into a fringe of icicles, and in a short time these grow so long a person cannot easily drink from a cup.

"The ice forms in this way on the eyelashes, and finally seals up the eye if not frequently removed.

"To avoid the trouble just mentioned, men are accustomed to shave off the beard; but they do not remove the eyelashes for fear they will not grow again."

FROZEN BEARD.

Then Miss Gray told about the observing station at Point Barrow, Alaska. During two winters parties have remained in this northern country to observe the weather, ice, and tides.

"The country around Point Barrow," said Miss Gray, "is very dreary. The tundra, or marshy plain, spreads away level and brown; at no point is the land more than fifty feet high. Vegetation is very scanty, consisting chiefly of moss and lichens, with a little wiry grass and a few simple flowers. The only shrub to be found is the dwarf-willow, which, instead of growing in an erect position, creeps along under the moss as if trying to hide from the cold blasts.

"The year at Point Barrow is divided into a severe winter of eight months and an uncertain summer of four months. Snow is apt to fall every day in the year at this place.

"During the winter the earth is frozen, and during the summer it thaws to the depth of a foot from the surface; but below that it is always frozen to an unknown

BROKEN FLOES OF ICE.

depth. Almost everything is the same, day after day except the length of day and night, which varies in that section much more than in places farther south.

"The huge fields of ice in this part of the Arctic Ocean are piled up some forty to fifty feet. No great icebergs are seen here, as about Greenland. The broken floes are thrown together in every possible position and shape. The picture now before us shows this.

"Travelling over such a surface as this is exceedingly difficult. Men having nothing to carry can advance only about eight or ten miles a day.

"Fred, have you ever seen the northern lights?" Miss Gray asked.

"I have seen them a few times."

"How did they appear?"

AURORA, OR NORTHERN LIGHTS.

"The last time I saw them, the northern sky was lighted up, and streams of light kept flashing in and out. Beautiful colored bands reached from one part of the heavens to another. At another time broad curtains of light were flung across the sky in various forms of graceful curves."

"Imagine the most beautiful display ever seen at home increased a hundredfold, and one would have some idea of the grand displays in the far North," said his teacher.

"I have read," added Mr. Cartmell, "that the arched form of the aurora was not common at Point Barrow; but that the curtain form, folded on itself like an immense scroll, as shown in the picture, was frequently seen there.

"In looking at the picture now shown on the screen by George, we must all try to imagine what the effect would be if the artist could have reproduced the many brilliant colors with which nature painted the sky at that time. Think of the sky being all rainbow tints, and these colors moving and dancing gayly about!"

"Now, Nellie," said her teacher, "can you repeat 'The Fairy Artist'?"

"I am rather sleepy, but I will try."

ORAL LESSON.

1. *Name the pictures in order.*
2. *Describe each picture.*
3. *Name the persons in the Cartmell family.*
4. *Describe the Frozen Region.*

LANGUAGE LESSON.

Write about the following topics: —

1. Describe the Cartmell family (see frontispiece and pp. 1–2).
2. The continent of North America.
3. The dog-sledges.
4. Point Barrow.
5. The Northern Lights.

LESSON II.

THE FAIRY ARTIST.

[In this poem we have a pretty description of the various figures seen on window panes after a frosty night. These figures are caused by the moisture or dampness in the air settling on the glass, where it becomes frozen and frosted over.]

OH, there is a little artist,
  Who paints in the cold night hours
Pictures for little children,
  Of wondrous trees and flowers —

Pictures of snow-white mountains,
  Touching the snow-white sky;
Pictures of distant oceans,
  Where pretty ships sail by;

Pictures of rushing rivers,
  By fairy bridges spanned;
Bits of beautiful landscape,
  Copied from elfin-land.

The moon is the lamp he paints by;
  His canvas the window pane;
His brush is a frozen snowflake, —
  Jack Frost the artist's name.

LESSON III.

WHALING.

"Is there any regular business carried on in this cold part of the world?" Mr. Cartmell inquired, after Nellie had recited the poem about "The Fairy Artist."

"Yes, **The Whaling Business**," George replied.

"The principal business of the beautiful city of New Bedford, Massachusetts, was formerly catching whales. At present the number of vessels engaged in this business is only one eighth of what it once was.

"The right or Greenland whale is still hunted in the Arctic seas, and vessels go thither in pursuit through Davis Strait and Behring Strait.

"Many vessels now sail from San Francisco to search for whales in order to get the whalebone, which is now more in demand than the oil.

"Whalebone is not the whale's bones, but the substance which hangs perpendicularly in parallel rows from the inside, or palate, of the mouth of the Greenland whale. The object of this structure is to form a good sieve, or strainer, for the food of the whale, as it comes in with the water.

"Although the whale has an immense mouth, he has a gullet, or food-pipe, so small that he is compelled to eat some of the smallest creatures in the sea.

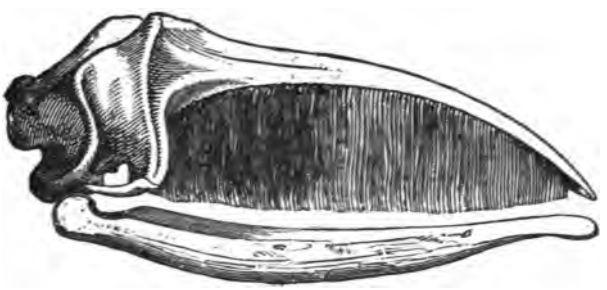
"To procure these little morsels, he engulfs a whole shoal of them at once in his great jaws, where they are of course entangled among the fibres of the whalebone. The

water is then strained off and expelled through the blow-holes, and what is left is passed into the stomach.

"Who can tell us more about this business?" Mr. Cartmell inquired.

Fred said, —

"While cruising about in whaling waters, one or two men are kept constantly in the crow's nest on the main-topmast to look out sharply for indications of a 'fish,' as the sailors call the great animal of the sea. The moment



SKULL OF GREENLAND WHALE.

the lookout sees at some distance away a whale 'blowing,' as it is called, he cries out, --

"'There she blows!'

"'Where away?' asks the captain.

"'Four points off the lee bow.'

"'How far off?'

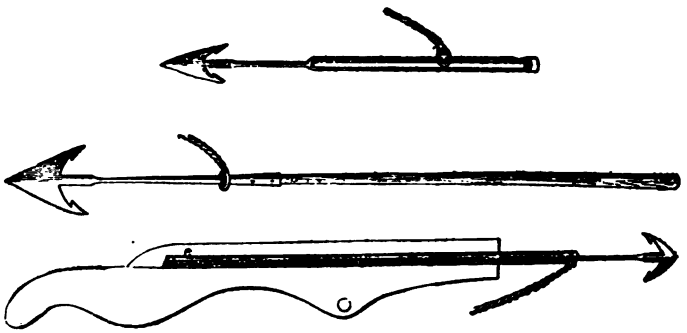
"'Nearly two miles.'

"All is now intense excitement on board. The ship sails towards the whale, as near as is prudent, and then the captain orders the boats lowered. They row as if in a race in the direction of the whale, which now and then goes down, and comes up again to blow. It is always

uncertain just where the whale will next rise, so each boat's crew is full of hope.

"When a boat reaches the whale, the gunner fires the harpoon, or it may be thrown by hand; and if well thrown, it will sink three or four feet into the body.

"The gun harpoon is very similar in shape and size to those used by hand. The gun is generally placed in the bow of the boat, the rope being fastened to the harpoon near the head.



HARPOONS.

"The whale usually dives the moment it is struck, and begins to run out the rope attached to the harpoon and carefully coiled up in one end of the boat. This rope is made of the best material, and about two and one half inches in circumference, and half a mile in length. The whole length is sometimes run out in five minutes. Should the line become fouled, the boat will be drawn down unless the rope is instantly cut, in which case the whale is lost.

"The water and ice about is soon dyed crimson with the flowing blood. At last, heaving its enormous tail, the

unhappy monster turns slowly over on its back and expires, amid the cheers of the boats' crews."

"Fred has given us a very graphic account of the harpooning of the monster of the deep," said his father. Mr. Cartmell then continued: —

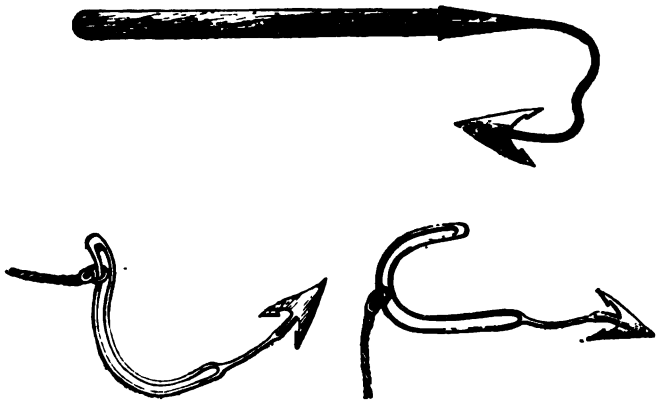
"After the whale has been killed, he is towed to the side of the ship, and fastened securely. Then commences

HARPOONING THE WHALE.

the work of 'flinching,' or cutting off the blubber, which is the outer layer of the carcass. The harpooneers stand on a platform over the whale and separate the blubber from the carcass in long strips which are hoisted on board by main tackles. These strips sometimes weigh a ton. The whalebone is separated and lifted on board. Then the carcass is allowed to sink.

"The 'flinching' operation usually takes from two to three hours. After it is concluded, the upper deck is in

a very filthy state, and so slippery a person is liable to fall in walking over it. The harpoons taken out of the whale are often twisted into strange shapes. To prevent their breaking they have to be made of very soft and tough iron."



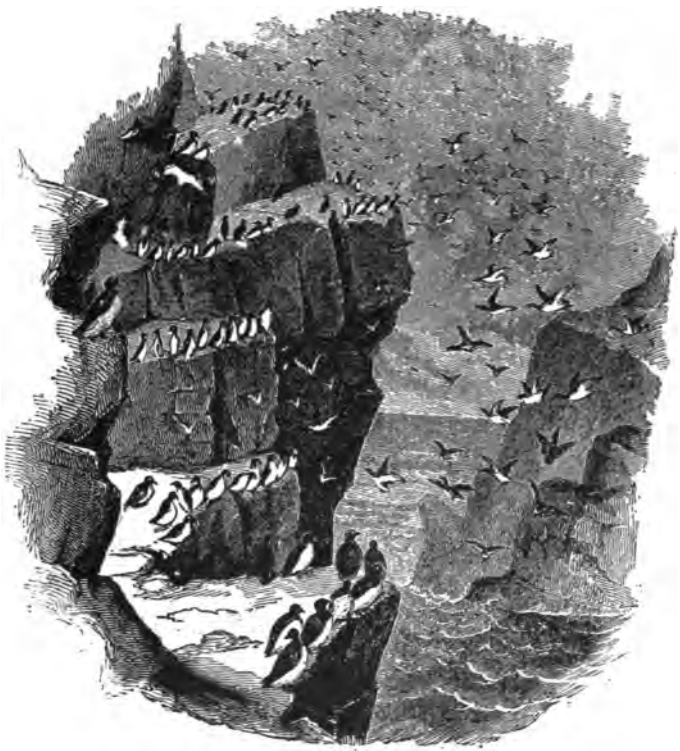
TWISTED HARPOONS.

Here Fred interrupted his father to say,—

"While the blubber is being removed, the greedy petrels, called by the whalers 'mollies,' clamor and fight for pieces of blubber to eat. These birds are so hungry they alight on the whale while the men are at work there. It is impossible to drive or frighten them away, though struck at with knives and boat-hooks. They can swallow enormous pieces of blubber."

"I have only a little more to add," Mr. Cartmell said, after Fred's story about the petrels was finished.

"The long strips of blubber are first cut into pieces about two feet square. Then these are sub-divided, and



MOLLIES.

the skin removed. Each piece now has the appearance of a huge lump of cheese.

"Then the blubber is tried out, just as lard is tried or boiled out of pork. When this is done at night, the brilliant glare upon the rigging and sails of the ship, the brawny forms of the men as they tend the fires, the thick clouds of smoke continually floating off, present a most weird and striking picture. All is cheerfulness and hope

at such times. The men reckon their 'lays,' and think of home and friends. A good-sized whale will usually yield one hundred barrels of oil, and the 'lay,' or part for a common seaman, would be about one barrel."

George then wished to know if any other kind of fish were taken for their oil.

CATCHING NARWHALS.

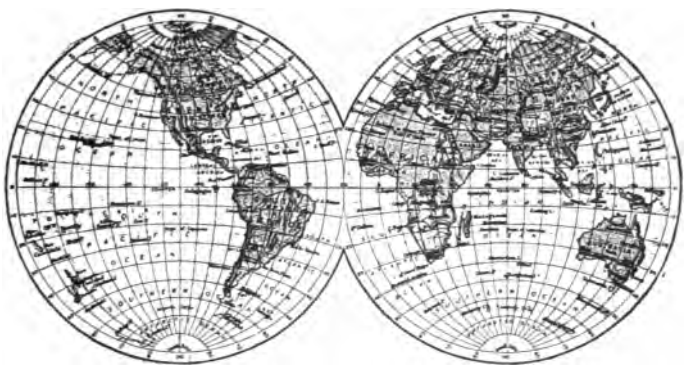
"When whales are scarce," Miss Gray said, "the whalers sometimes hunt the narwhals, or unicorns. The sailors call them 'unies,' which is shortened from the proper name. The fish have one long horn on the left side of the nose. It is seven feet long in a unicorn whose body measures eighteen feet. The under-side of this fish is of a beautiful pure white."

This account closed the first evening's entertainment.

LESSON IV.

LAND AND WATER MASSES.

"BEFORE we talk any more in detail," said Mr. Cartmell, at the second meeting, "about the grand divisions of the world, it will be well for us to get some idea of how the land and water are distributed on the surface of the earth.



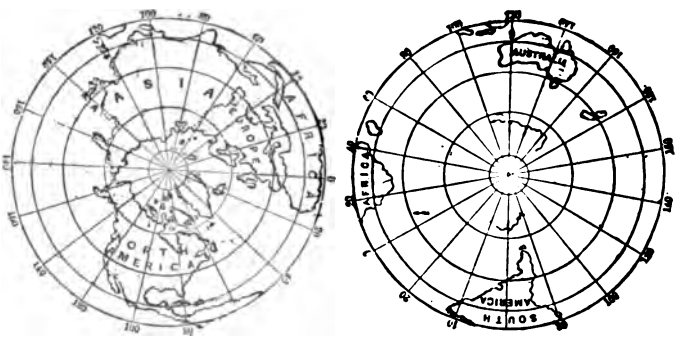
EASTERN AND WESTERN HEMISPHERES. (1)

"To help you understand this, I have prepared some large charts on manilla paper.

"The surface of the earth is usually divided into two equal parts, called *hemispheres*. According to one method of division, these are the *Eastern Hemisphere*, or Old World, because first settled, and the *Western Hemisphere*, or New World, because settled in modern times. These are shown on the first chart in this chapter.

"In this division, the meridian of 20° west from Greenwich, or the Iceland meridian, is taken as the line dividing one half from the other. This is a very convenient arrangement, as it places the three grand divisions, Europe, Asia, and Africa, in one hemisphere, and North and South America in another.

"We can take the equator as the dividing line, and then we have a *Northern Hemisphere* and a *Southern Hemisphere*.



NORTHERN AND SOUTHERN HEMISPHERES. (2)

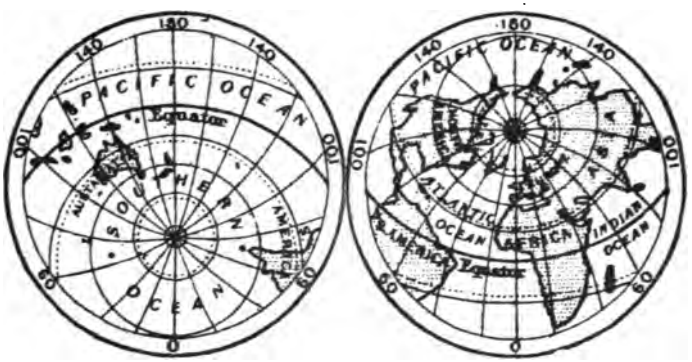
"A glance at chart number two shows how much more land there is in the northern half than in the southern half. In this division, the poles, you see, are the centres of the hemispheres.

"If a globe is turned so that London is the centre of a hemisphere, it will be seen that one hemisphere is produced which will include nearly all the land on the surface of the globe, and another hemisphere which will contain most of the water surface. These are therefore called the *Land Hemisphere* and the *Water Hemisphere*."

"Is there any other way to show the whole surface of the globe?" George asked.

"It can be represented as if unrolled from a cylinder. This kind of a map shows the direction of one place from another very clearly.

"From the map on page 24 it is seen that the land is mostly grouped in two large masses. The land runs into sharp-pointed peninsulas towards the south, while the oceans are the reverse of this, and have less width towards



LAND AND WATER HEMISPHERES. (3)

the north. On this map the northern and southern parts are made larger than they ought to be. The left-hand part west of the heavy perpendicular line marked 180° is repeated, so as to show the shape of the Pacific Ocean. The figures at the side show the real size of a square on the surface of the earth at that part.

"Europe and Africa are separated from North and South America by the Atlantic Ocean. Although the Atlantic is one of the narrowest of the five oceans, it is one of the principal highways of commerce, and is constantly crossed by many steamers and sailing-vessels.

The figures at the side show the different sizes of the squares.

THE WORLD AT ONE VIEW.

Steamers now cross the three thousand miles between New York and Liverpool in six days, moving nearly as rapidly as an express train.

"The Pacific is twice as large as the Atlantic Ocean, but it has very much less commerce. Lines of steamers run from San Francisco to China and Japan in about twenty days, the distance being about six thousand miles."

"Please show us how a person may sail round the world," said Nellie, in an inquiring tone.

"By following the route indicated on this chart by this line," said her father, pointing to the largest chart. (A part of this route is shown by a heavy line on the Map of the World, page 24.)

"If we should start to sail directly round the world from the eastern side of America, — say from New York or Boston, — we should first cross the Atlantic Ocean, then pass through the Mediterranean Sea, through the Suez Canal into the Red Sea, then cross the Indian Ocean into the Pacific Ocean. After crossing the Pacific we would reach the western side of America, and come to port at San Francisco, whence we should sail south along the coast of North and South America, double Cape Horn, enter the South Atlantic, and sailing north, in time reach our starting-point. In this voyage the Atlantic would probably be very rough and stormy compared with the ocean on the western side of America. As the first sailors on the latter ocean entered it after encountering the storms of the Atlantic, they naturally named it the Peaceful Ocean, or the *Pacific*."

There are other ways of going round the world in a steamer or sailing-vessel, but they are longer than the one given above.

"How long does it take now to go round the world?" Florence inquired.

"By taking the fastest steamers and trains, a person can now go round the world, a distance of over twenty-five thousand miles, in about seventy days. The shortest route in time is indicated on the map on page 24.

"In making these voyages, you notice, the Arctic and Antarctic Oceans are not visited, because all the year round the greater part of them is covered with ice, as we learned in the first chapter. Only one ship has ever passed round the northern shore of America, — Captain McClure's, in 1852; and only one round the northern shore of Europe and Asia, — the 'Vega,' under Captain Nordenskiold, in 1880."

"What is the use of having so much of the earth covered with salt water, Father?" inquired Fred.

"It is not wise," replied Mr. Cartmell, "to consider the oceans the waste and useless parts of the earth. All life owes its existence to the ocean, because the vapor, which is constantly rising from the oceans, is carried by the winds to the land, upon which it falls as mist or rain.

"You may have read how in many cases hot winds are cooled, and cold winds warmed, by passing over the oceans. Countries which are near the sea are not so hot or so cold as those which are further away from it.

"The sea is also valuable in furnishing us with a variety of food and clothing. Cod, mackerel, salmon, herrings, sardines, oysters, clams, and many other fish come from the sea, supplying a large part of the food used by mankind. Scarcely less useful to the world are certain sea-animals, such as the whale and the seal.

"But most persons," continued Mr. Cartmell, "go to sea to carry articles of food or clothing from one country to another.

"The tea and coffee we drink; the sugar with which we sweeten those drinks; the bananas, pineapples, and many of the oranges, lemons, and raisins we eat; the silk for our dresses, ribbons, and scarfs; the best kinds of cloth for clothes, — are all brought here in ships.

"What do we send to other countries, Fred?"

"We send at the same time to other countries, cotton, oil, bacon, lard, tools, wheat, lumber, and machinery.

"The oceans are also useful as **Highways for Ships**; that is, they are the great roads along which every one is free to pass when and where he likes. We have seen how a person can travel from one country to another by sailing over the ocean. Some persons go to sea because the salt air greatly benefits their health.

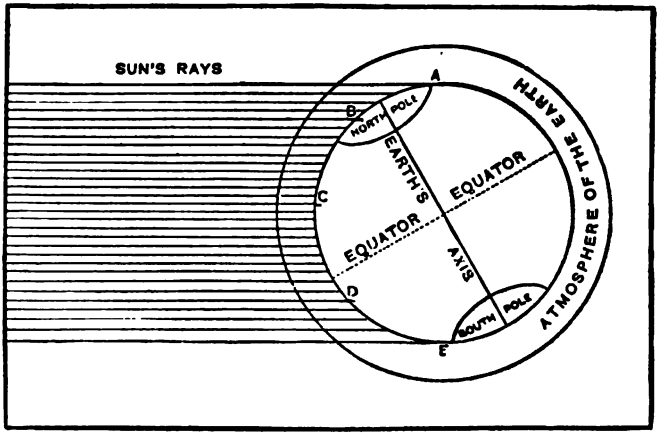
"Others go abroad because they wish to see what other countries and other people are like. When such persons come home again, they often write books about what they have seen; and so we are able to learn almost as much about other parts of the world as if we had been there ourselves."

Then Nellie asked, "Is the surface of the earth divided in any other way, Papa?"

Mr. Cartmell replied to Nellie's question, —

"The surface of the globe may be divided into belts according to the amount of heat. If an iron globe be placed in the sun so that the rays shall strike it at the same angle as they strike the earth, it will be found that the part nearest the equator will become much warmer than the parts above and below.

"From this fact we learn that the amount of heat carried to any part of the earth by the sun's rays depends partly on the direction in which they strike, and partly on the length of time during which they shine upon it. We can best understand this by a simple illustration which almost explains itself.



"From the figure, we see at a glance the following facts illustrated: —

(1) "That the rays of the sun reach the earth in directions parallel to one another.

(2) "That some rays fall on a part of the earth directly facing the sun. These are called *direct*, *vertical*, or *perpendicular* rays.

(3) "That all other rays reaching the earth fall on parts which curve more or less away from the first-mentioned part, in paragraph 2 above. These rays are said to fall obliquely, or slantingly, on the earth's surface, and are therefore called *oblique* rays.

(4) "We also notice in the illustration that the earth is represented as surrounded to a certain height above the surface by the atmosphere. Now, this air, however dry it may seem, always contains vapor, especially in the part near to the earth's surface. One of the properties of this vapor is to absorb heat. Consequently, as the sun's rays pass through the air, they lose some of their heating power, even when the sky is clear, and in cloudy weather they lose so much that very little heat in comparison reaches the earth.

"As the oblique rays have to travel farther through the atmosphere than the direct rays, they, the oblique rays, lose more of their heating power.

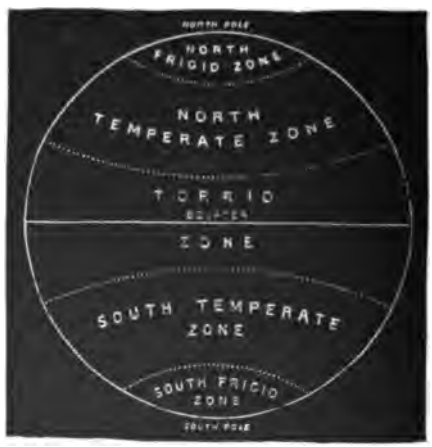
(5) "We may observe another and far more important difference between the vertical and oblique rays. The curved line between A and E represents part of the rounded surface of the earth. It is divided by the letters B, C, D, into four equal parts. Now, if we count the rays falling upon each of these separate parts, we shall see that, though all these rays are equally close together, they do not fall in equal numbers on equal spaces of the earth's surface. The parts of the earth which receive the rays obliquely get fewer of them and consequently less heat than is received by those parts of the earth which receive them directly.

"The illustration given above shows the position of the earth in reference to the sun's rays during the northern summer months. The part of the earth's surface marked *equator* receives daily the largest amount of heat. That section is called the Torrid or Hot Zone or Belt.

"Life is very abundant in this belt, both animal and vegetable. The largest land animals live in the hot coun-

tries. Here one finds the elephant, lion, tiger, giraffe, hippopotamus, and python. Palms, baobab, banyan, fern, banana, and orange trees are seen in every part of the torrid zone.

"We have talked in previous chapters about the cold belt, commonly called the Frigid Zone, which is situated around the poles, as far as possible from the hot country.



It is a cold, disagreeable country. You remember that instead of great forests of noble trees there were mosses, shrubs, and dwarf trees. Do you remember what land animals are found there?"

"The land animals," replied Florence, "are the reindeer, musk-ox, and the white bear."

"The sea animals are much more important," said George. "They are the whale, walrus, and seal."

"How many of these cold belts are there?"

"There are two such belts, known as the Arctic and Antarctic Zones."

"That is correct, Florence."

"The two Temperate Zones are between the very hot and the very cold parts of the earth. They contain hardy forest trees and all those plants most used by man for food and as material for manufactures, — as the grains, potatoes, fruits, flax, hemp, and cotton. The animals most useful to man are found here, — the horse, cow, sheep, and dog."

TWO POLAR BEARS.

"What can you say about the wild animals, Fred?"

"The wild animals belonging to this zone are most of them moderate in size and ferocity. They are the bear, wolf, lynx, fox, deer, squirrel, etc. The birds include eagles, turkeys, pheasants, geese, robins, sparrows, crows, hawks, larks, bobolinks, mocking-birds."

Mr. Cartmell finished the lesson by saying, —

"The latter are noted for their splendid powers of song, though their sober plumage contrasts gloomily with the brilliant colors of tropical birds. Here, also, is the home of the honey-bee and of the silk-worm."

LESSON V.

LOFTY MOUNTAINS.

"TO-NIGHT, my dear children," began Mr. Cartmell, "we study about the lofty mountains and lovely valleys of this great country."

"Can Florence tell us something about the slopes of the country?"

"The **Surface** of North America consists of two single ocean slopes and a double interior slope. The profile would be simply sketched in this way" (drawing on paper so all could see).

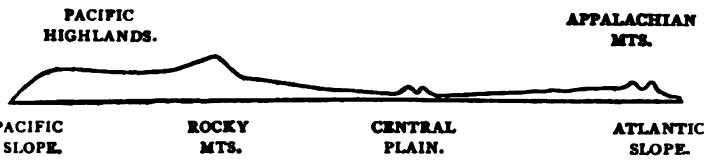
PACIFIC SLOPE. DOUBLE INTERIOR SLOPE. ATLANTIC SLOPE.

"But," added Miss Gray, "when the details are more fully studied, we say that the surface of this grand division consists of the Atlantic slope, the Appalachian Mountains, the basin of the Mississippi or Central Plain, the Rocky Mountains, the table-lands, the snowy ranges, and the Pacific slope. The Central Plain has its northern and southern slopes as well as its eastern and western."

Then George threw upon the screen a large **Physical Map**, and his father remarked: —

PHYSICAL MAP OF NORTH AMERICA.

"What Miss Gray has just told us is very well shown to the eye by the shaded physical map now before us. Imagine this map to be made by your teacher, upon the floor, of sand or putty, and that the material had dried till it hardened. Suppose, before it hardened, Fred had taken a long knife, and cut the map in two parts about two thirds of the way from the top or northern part. Looking at the edge thus found, it would have the appearance seen on next page, and which we call a profile."



Miss Gray then said, in answer to a question from Fred: —

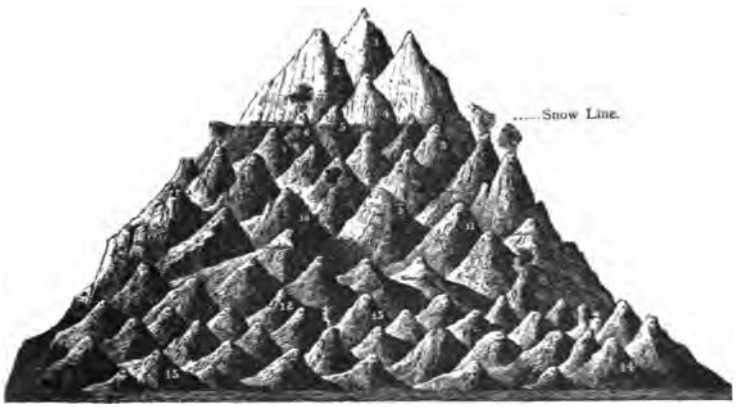
"The most elevated section of North America, as shown by map and profile, is found on the western side, covering about two sevenths of the whole area. Next to the mountainous areas of Asia, this section is the most extensive region of great heights in the world.

"The **Rocky Mountains**, *proper*, form a very long ridge of great elevation half-way between the Mississippi River and the Pacific Ocean. They are the eastern edge of a great table-land, varying in width from four hundred to nine hundred miles, of which the Cascade and Coast ranges form the western fringes. The Rocky Mountains are the mighty watershed of the country. From them branch off all the other mountain chains. From them slope, to east and west, immense river basins.

"The great table-lands west of the ridge are subdivided into various grand basins, each one named after its great river. Beginning at the north with the Yukon Basin, each successive basin towards the south rises higher and higher till the lofty table-lands of Mexico are reached, far above the tops of the loftiest mountains east of the Mississippi Valley. In this whole region there is, with one exception about the National Park, little evidence of volcanoes, craters, or lava. Scooped out of the main mass are many valleys of great size and beauty called *parcs*, or immense inclosed plains."

"Are mountains usually of about the same height?" inquired Nellie.

"There is a wonderful difference," replied her father, "in the *comparative height* of the most noted peaks in North and South America. We can best realize this by drawing a number of mountain peaks on the same scale. In the group of peaks shown at this time, some of the more important mountains are designated by figures, and their names are given below."



COMPARATIVE PEAKS.

1–6. MOUNTAINS IN SOUTH AMERICA.
7. POPOCATEPETL, MEXICO.
8. MT. ST. ELIAS, ALASKA.
9. SHASTA, U. S.
10. LONG'S.
11. FREMONT'S.
12. WASHINGTON.
13. GRANDFATHER.
14. CATSKILL.
15. WACHUSETT.

"The most beautiful and noted of these are in Colorado, west of Denver. Any child in that city can step to the window of his schoolroom, and see to the north Long's Peak, beyond which is North Parc; to the west Gray's Peak, beyond which is the Middle Parc; to the south

Pike's Peak, between which and Gray's Peak lies the great South Parc, and still farther south the San Luis Parc. The latter is a valley, level as a table, one hundred and forty miles by forty miles, and eight thousand feet above the ocean, walled in by snow-covered mountains. In these parcs rise a number of important rivers.

NORTH PARC.

"Are there not, Miss Gray, mountains farther west?"

"The **Coast Range** of mountains running through California is very near the coast, and has a width of about forty miles. Between it and the Sierra Nevada lies one of the largest bodies of fertile land in the world. It is a valley four hundred miles long by fifty to seventy miles wide, containing over five millions of acres.

"Through this long valley flow two rivers, — one rising at the foot of Mount Shasta, and flowing south;

its twin brother rising in the foothills of the Sierra, and flowing north, — meeting in the centre of the valley, and passing through a narrow strait into the Bay of San Francisco. This valley is shut in by the flanking mountains. It is fairly well supplied with moisture during the rainy season; but in the dry summer season the valley

GRAY'S PEAK.

is an immense oven, with a cloudless sky, which produces marvels in the way of vegetation.

"You ought, Mr. Cartmell, to tell the children about the mountains in Colorado."

"Any person," said Mr. Cartmell, "visiting the beautiful city of Denver, obtains grand views of the Rocky Mountains. The city itself is over five thousand feet above the sea; and from this elevation rise three noted peaks, each over fourteen thousand feet high. To the south is Pike's Peak, which Major Pike attempted to climb in 1803; but he was obliged to turn back, sadly remarking, 'Nothing but a bird could reach its snowy

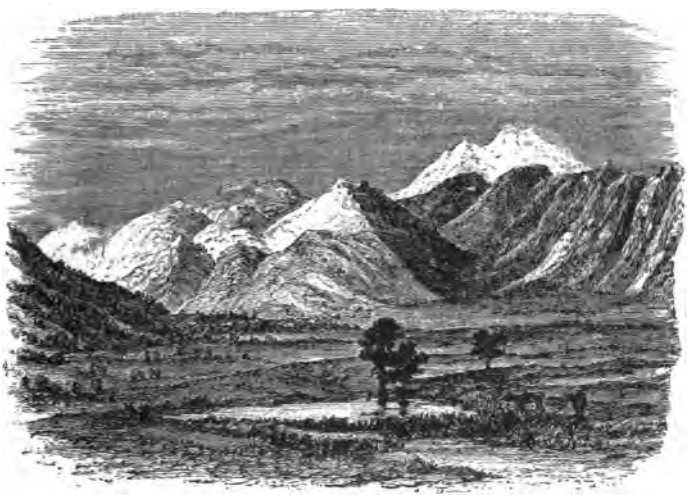
summit.' Now ladies and children ride on horseback to the top. The United States Signal Bureau has a station there, in which men live the year round, and daily report about the weather.

TOP OF GRAY'S PEAK.

"To the west of Denver is Gray's Peak. Tourists usually make the trip to it on horseback. Those who wish to enjoy it the most take a part of two days to ascend to the summit, spending the night at a cottage at the foot of the mountain. By this arrangement the ascent can

be made in early morning, always the best part of the day for climbing.

"The summit is so high that in the hottest days in August extra clothing is needed. The beautiful picture of the top of this mountain, now shown us by George, shows how the mountain looks when most of the snow



ESTES PARC.

disappears. Mountain peak after mountain peak is seen in every direction from the top. Pike's Peak seems only a short distance away; but it is really one hundred and fifty miles. South Parc appears to be almost at one's feet. One of the most noted mountains seen from this point is the Mount of the Holy Cross. (See page 44.)

"George, what peak is seen to the north?"

"To the north, Long's Peak appears. It was named after Colonel Long, who visited it for the first time in 1820."

"This peak," continued Mr. Cartmell, "was first ascended by a woman in 1879. The bird Major Pike called for to wing its way to the top of another peak, had come from far-away England, in the person of that brave traveller, — Miss Isabella L. Bird. But brave and resolute as she was, she never would have reached the summit

LONG'S PEAK FROM ESTES PARC.

if it had not been for the help of a strange, rough, Western character called 'Mountain Jim.'

"This Jim was a shocking figure. He wore a pair of high boots, baggy trousers of deer-hide, a leather shirt, and over that three unbuttoned waistcoats. His hat was a big, torn "wide-awake," under which hung his neglected ringlets. He had only one eye. For weapons he carried a long knife and a revolver. His rifle lay across the saddle; his axe, canteen, and other travelling articles,

hung to the horn of the saddle. To complete the picture, he rode a small Arab mare full of life and spirit.

"This strange person, a Western desperado, promised he would escort Miss Bird to the top of the mountain, which is over fourteen thousand feet high. They started from Estes Parc, smaller but more lovely than any of the other parcs mentioned, and soon entered the great pine forest. Here they obtained occasional glimpses of valleys below, and distant peaks above them.

"When about eleven thousand feet high they unsaddled and picketed the horses. Jim built up a great fire, and supper was served, — the tea being drunken from old tin cans, and the meat eaten without plates or forks, in true picnic style.

"Jim was always accompanied by his dog 'Ring,' said to be a wonderful hunter. This dog had a noble face, with an almost human expression. Although sometimes ill-treated he was true to his master, and rarely took any notice of other persons.

"Jim pointed to Miss Bird, and said, 'Ring, go to that lady, and don't leave her again to-night.'

"Ring at once went to her, and after looking her in the face, laid his head on her shoulder, and then lay down beside her with his head in her lap. At night Ring lay beside the lady to keep her warm, for the mercury was twelve degrees below the freezing-point.

"In the morning they had a grand sunrise, which made such an impression on Jim that he uncovered his head, and exclaimed, 'I believe there is a God!'"

"Did they go any farther that day?"

"At seven they started forward and rode as far as the 'Lava Beds.' Here the horses were left, and the rest of

the climb was performed on foot. At the 'Notch' there are splendid views of the distant parcs, and the snowy ridge of the 'Divide.' On one side they could see where the Grand River takes its rise and flows into the Colorado, and on to the Pacific; nearer, on the other side of the ridge, they saw the Thompson burst forth from the ice, and begin its journey to the Gulf of Mexico. Miss Bird proved to be a poor climber, and Jim showed great patience and care in helping her; but he finally had to drag her up by sheer force of muscle.

"Beyond the 'Notch' were two thousand feet of solid rock with barely foothold for a lady of little mountain experience. In one place they walked along a narrow shelf overhung by a cliff, so that they had to crouch. The peak was nearly vertical four hundred feet above, and below, a tremendous precipice. Here one slip and the traveller would lie three thousand feet below, a shapeless mass of humanity. Ring refused to cross this narrow ledge, and was left behind.

"The last five hundred feet of the summit was a smooth, cracked face of granite, which required one hour to climb. In some places Miss Bird had to crawl on her hands and knees. She suffered greatly from thirst, and the difficulty of breathing so rarefied or thin an atmosphere."

Nellie wished to know what was found on the top, after all the trouble of climbing.

"The summit, when it was at last reached, was found to be a level acre of bowlders, having steep sides all round except the one side they ascended.

"The views were grand, and amply repaid all the hardship of the climb. Snowy ranges, one behind another,

extended to the far away horizon. Pike's Peak could be plainly seen a hundred miles to the south. Gray's Peak was much nearer. Giant forms rose on every side; but away to the east stretched the green gray of the endless plains, crossed by numerous rivers, whose courses were marked by the trees growing along their banks."

DRAWING LESSON.

1. *Draw a sketch-map of North America.*
2. *Draw a dog-sledge.*
3. *Sketch the skull of a whale.*
4. *Draw two kinds of harpoons.*
5. *Draw a boat.*
6. *Draw a Land Hemisphere.*
7. *Draw the World at one view.*
8. *Draw a figure of the sun's rays shining upon the earth.*
9. *Draw a map showing the Zones.*
10. *Represent a profile of North America.*
11. *Sketch the comparative heights of different mountains in South and North America.*

LANGUAGE LESSON.

Put the following words into good long sentences:—

Whalebone, skull, harpoons, two sevenths, petrels, sub-divided, evening's entertainment, hemisphere, perpendicular, commerce, Suez canal, mackerel, Nellie's question, illustration, sun's rays, oblique, musk-ox, banana, bobolinks, Mississippi, Long's, parcs, vegetation, don't, foothold.

THE MOUNT OF THE HOLY CROSS.

LESSON VI.

MOUNT OF THE HOLY CROSS.

FROM the top of Pike's Peak or the crest of Frémont Pass can be seen the **Mount of the Holy Cross.** It is a summit which would attract the eye anywhere. The snow-white emblem of the Christian faith gleams with bright splendor against an azure sky. The cross is formed by two cañons crossing each other, of immense depth, running down and across the summit of the mountain. In these cañons the snow lies the year round. The symbol is nearly perfect in shape, as shown in the photographic picture given above.

MOUNT OF THE HOLY CROSS.

WILL L. VISCHER.

Where Nature's God hath roughest wrought,
Where spring the purest fountains,
Where long ago the Titans fought,
And hurled for missiles mountains,
Where everlasting snows abide,
And tempest-clouds are driven
Along the solid granite side
Of yawning cañons, riven
Deep in the Rockies' grandest pride
That lifts its head to heaven, —

Amid the wilds, where awful rise
The giant peaks that fathom
Night's starry depths and day's blue skies,
One monarch 'mongst the mighty hills
Rears high his summit hoary,
Like some grim king whose legend fills
A page of olden story,
And heart o'erawes and soul enthrills
Before his regal glory.

The holy cross of Christian faith,
Above the royal velvet,
In beauty shines, an emblem wraith,
High on the beetling helmet;
Its white arms, stretching through the sheen
Of silvery mist, are gleaming,
A talisman the world to screen,
Hope's symbol in its seeming, —
A wonder grand, a joy serene,
Upon the ages beaming.

GATES OF THE ROCKY MOUNTAINS, NEAR LIVINGSTON, MONTANA.

LESSON VII.

WONDERLAND.

"THE Rocky Mountains," said Miss Gray, "differ from most ranges, especially on the eastern side, because they usually rise *directly from the elevated plains*, without lower mountains, or foot-hills, to cut off the views. This is one reason why persons in approaching them from the east are generally deeply impressed with their size and grandeur."

George kindly showed them again the pictures of the Colorado mountains, that they might the better realize the truth of their teacher's remarks.

"In approaching the Rocky Mountains," said George, "over the Northern Pacific railroad, the first views illustrate Miss Gray's remarks. The mountains not only rise abruptly from the plain, but the range is broken into two parts in such a way as to suggest 'gates,' or approaches.

"Leaving the trunk line at Livingston, a short branch road carries the traveller to the borders of **Wonderland.**"

"Many of you have read," said Mr. Cartmell, "of the remarkable geysers of Iceland and the more remarkable ones in New Zealand, of grand cañons in Arizona, of deep mountain gorges in Colorado, of stupendous falls in Africa, of lofty mountains covered with snow in Europe, of elevated lakes in South America, of strange, fantastic-shaped pillars in Monument Park, of natural bridges in Virginia; but who has ever conceived of having all these wonders in one spot of the earth, accessible by Pullman cars, and forever free as a great National Park, visited each summer by thousands of native and foreign travellers? What great nationality but the United States would actually carry out so gigantic a scheme?

"Travellers report that this corner of the earth seems to be not quite finished by the great Creator. Through all this region volcanic action has been exceedingly vigorous. The effect of fire upon the rocks is plainly visible and widely spread. Whole mountains of volcanic rock exist. Floods of lava everywhere abound. The last feeble evidence of this gigantic force is to be seen in the hot springs on Gardiner River and on many other streams and in the strange action of the geyser basins."

"To-night George may have the first opportunity to talk about **The National Park.**"

"I am all ready," George replied, as he threw upon the screen his first picture. "The park is situated at the sources of the Missouri and Snake rivers, mainly in the northwest corner of Wyoming Territory, on about the same parallel of latitude as New Hampshire, New York, and Michigan. It is said to be sixty-five miles from north to south, and fifty-five miles from east to west.

"It is larger, therefore, than Rhode Island and Delaware united; it is almost half as large in area as the Commonwealth of Massachusetts; it would cover two thirds of Connecticut.

"The name 'park' is quite misleading to most people. It is rather a great reservation, in which are situated many parks, valleys, rivers, cañons, falls, and lofty mountains, and one very fine lake. Some of the mountains are over ten thousand feet high. The Yellowstone Lake is much higher than the top of Mount Washington, being eight thousand feet above the sea."

Mr. Cartmell here interrupted George to say, —

"Although travellers now generally enter the park from the north, as you said, there is now another branch road from the Union Pacific through Idaho."

Then George continued, —

"There are four important points to see while there; namely, the Mammoth Hot Springs, the Upper Geyser Basin, Lake Yellowstone, and the Falls and Grand Cañon of the Yellowstone River.

"The **Hot Springs** are near the northern entrance, and should be visited first. These springs are on the Gardiner River, a branch of the Yellowstone.

"At the top of a terrace near the banks of this river are large hot springs whose waters are wonderfully

clear and transparent, and full of lime and iron well dissolved.

"The largest spring is near the edge of the summit of the hill. As the water pours down the side of the hill, it builds up semicircular basins of various sizes and shapes.

MAMMOTH HOT SPRINGS.

"Some of these basins are six inches in height, others are eight feet. All are scalloped, and adorned with a kind of beadwork so beautiful no words or pictures can do justice to the work of Nature's great artist. The colors of these basins are every variety of shade of scarlet, green, and yellow. The temperature of water in the upper basin is from 150° to 200°. It gradually cools as it falls from terrace to terrace, so the bather can find any degree of heat he pleases."

Miss Gray asked George if he knew the name of the mountain in the background of the picture, and he said he did not.

"That mountain is named after a Mr. Evarts, a gentleman of culture and refinement, who was travelling through the park with a company, and by some accident became separated from the rest of the party, and wandered about the base of the mountain for two or three days, unable to find his friends. After a careful search he was rescued in an almost exhausted condition. It was several months before he fully recovered his health."

"About fifty miles south of the Mammoth Hot Springs," continued George, "in the southwestern corner of the park, are found the upper branches of the Madison River, and the **Upper Geyser Basin**, a section some twenty miles square."

"Who can tell of what river the Madison is a branch?"

"It is, according to my map, a branch of the Missouri."

Mr. Cartmell then spoke of the Geysers: —

"There are sixteen important geysers in this section, and innumerable inferior ones. One geyser is called the 'Giantess.' It throws a great mass of water to a small height, surging and splashing in all directions as shown in the picture opposite. One of the most noted geysers is called the 'Castle Geyser,'[1] because of its size and general appearance. The opening of the geyser tube is circular, and about three feet in diameter.

"When this geyser is about to spout, a rumbling is heard of thousands of tons of stones rolling round and round, piling up in heaps, and rattling down again, mingled with the lashing of the water against the sides as it surges up the funnel and falls again in spray. Louder and louder

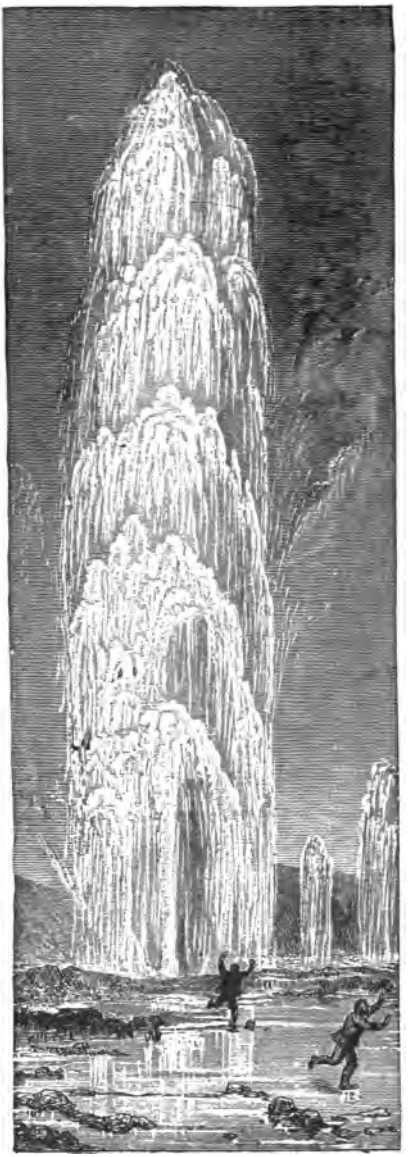
[1] See page 52.

grow the noise and disturbance, till it has thrown out a few tons of water and obtained apparent relief.

"These are warnings to the observers to retreat to a safe distance. In a few moments the geyser increases in noise, the earth even trembles, and then a great column of water is hurled into the air."

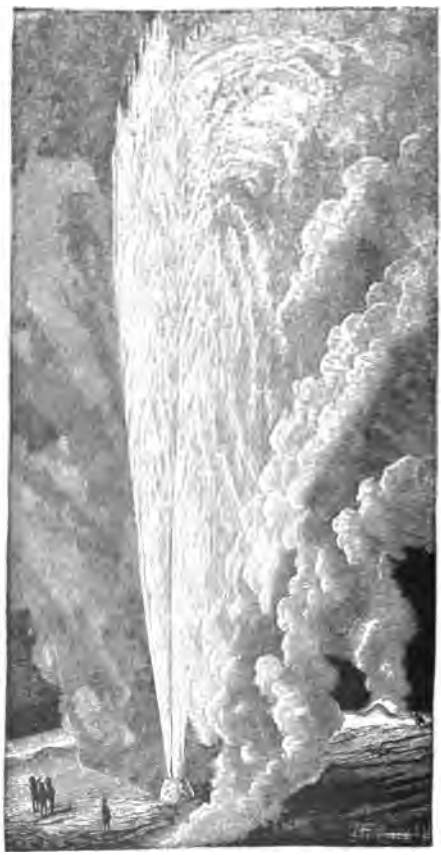
"How high does the water rise in the air?"

"The column of water reaches at its greatest elevation a height of over one hundred and fifty feet. The spray and steam of course are driven through it up to a much greater elevation. The column of water is quite vertical, and slowly increases in height till the highest point is gained. The spray descends in heavy rain over a large area, and torrents of hot water pour down the sloping platform."



"Is much noise made by this geyser?"

"The noise of the eruption is almost beyond description. Imagine a gigantic pot boiling madly with a thun-



THE CASTLE GEYSER.

der-storm in its stomach, and half-full of great stones rolling and knocking about against its sides. Add to all this

the shrieking of a score of steam-pipes blowing off, and you will have some idea of an eruption of the 'Castle.'"

"How long does the display last?" Nellie asked.

"The total display lasts about an hour. Miss Gray has something more to tell, I think."

"Another geyser is 'Old Faithful,' so called because he plays regularly every sixty-five minutes. The crater is quite low, and contains an opening which is only the widening of a crack extending across the whole mound. On the summit, at the foot of the mound, are a number of beautiful little pools, several feet deep, filled with water so clear that a name written in pencil on a piece of stone and placed at the bottom of the deepest pool is seen as clearly as if held in the hand. Another remarkable fact is, that the water does not efface the name, even after months of submersion.

"Old Faithful begins with a few feeble jets. Soon every spasm becomes more powerful, till with a mighty roar up comes the water in a great column. This rises to the height of one hundred and thirty feet for the space of about five minutes. After the column of water sinks down there is a discharge of steam."

"What are the names of some other geysers?"

"The 'Beehive Geyser' is named after the shape of its cone. The water and steam issue from the opening in a steady stream, instead of in successive impulses, as in the two mentioned above. No water falls back from this geyser, but the whole mass appears to be driven up into fine spray or steam, which is carried away as cloud, or diffused into the atmosphere.

"The names of some of the other well-known geysers are the Giant, Grotto, Soda, Turban, and Young Faithful."

"Who can tell us about the lake in the Park?"

Fred said he had learned that

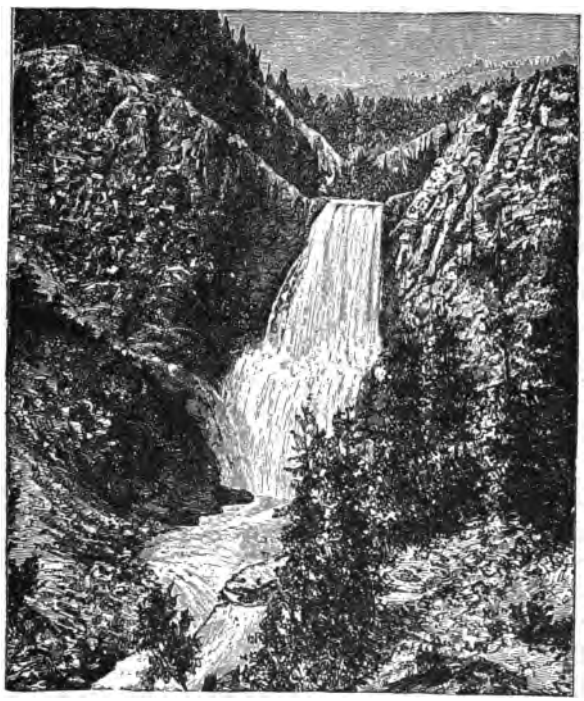
"The **Yellowstone Lake** is one of the most beautiful sheets of water in this country. Its long arms, extending far inland, embrace many mountainous capes in their grasp. On the west shore of the lake is a hot spring, where one can catch trout in the lake and without moving cook them on the hook in the boiling caldron."

YELLOWSTONE LAKE.

"The same can be done," said his father, "in several places on Gardiner River, a short branch of the Yellowstone.

"When the Yellowstone River leaves this lake it flows in a calm, steady current for many miles, and then, before charging through the range of mountains which oppose its passage to the north, it performs a series of gymnastics over rapids, cascades, and waterfalls, as if

exercising its muscles and sinews for the mighty effort of tearing a way through the granite flanks of the range. This great effort has finally produced a cañon, or rent in the mountains, twenty miles long and of vast depth.



LOWER FALLS, YELLOWSTONE RIVER.

"The volume of water is not very great, nor are the falls noted for their height; but they have a savage beauty all their own, a wild loveliness peculiar to them. What they lack in volume and power is made up by the lavish

display of color and the strange forms of rock everywhere seen.

"There are in the Grand Cañon of the Yellowstone — a gorge which has only one rival, that of the Colorado — two different falls, called the **Upper** and **Lower Falls**. The former is reached first in descending the river from the lake, and is eighteen miles away. Here the sides of the cañon converge, or contract, the green water rises to a great height and soon dashes over a ledge into the air, falling one hundred and forty feet, or more than twice the height of Niagara Falls.

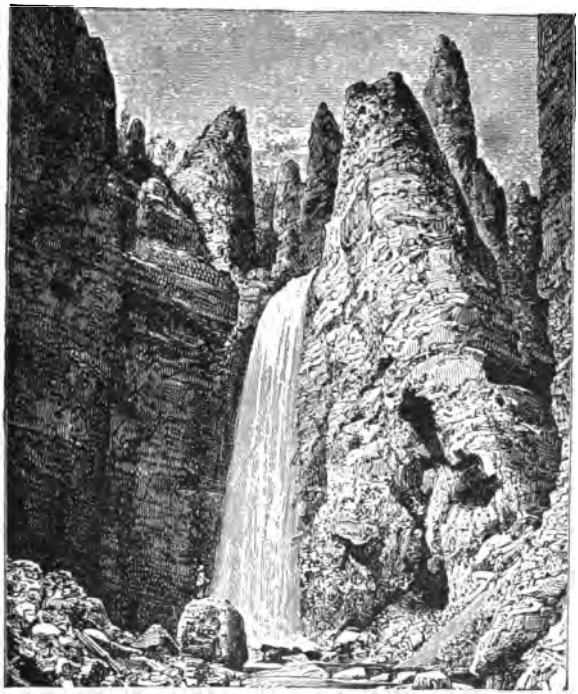
"Immediately after its leap into the Horseshoe Basin the river bends somewhat suddenly to the left, and rushes for half a mile in a series of small rapids over the low ledges and fragments of rock composing its bed. The waters are again compressed and heaped up into a narrow channel, and with greater velocity than before take the second leap of three hundred feet, falling with a dull thud into a circular foaming caldron, bounded by steep precipices eight hundred feet high.

"The upper cascade, though much the smaller of the two, is the most beautiful, being more instinct with life, motion, and variety than the other; but the lower fall is by far the most impressive. The varied tints of the cañon itself, — red, yellow, orange, white, — the dark-green pines fringing the top, and the bright green of the spray-nourished moss on the sides of the falls make a picture of each fall almost unequalled in magnificence and grandeur."

"There are scores of other falls," said George. "One of the most remarkable is shown in the next, and last, picture of this wonderful land. It is named the Tower Falls, on account of the columns of rock resembling

towers, spires, and minarets which stand like gloomy sentinels at the entrance of some grand temple."

"In addition to what we have studied to-night," added Mr. Cartmell, "there are numerous gorges and lakes, hun-



THE TOWER FALLS, NATIONAL PARK.

dreds of geysers, and mud volcanoes in the National Park, each of which would be a remarkable natural curiosity east of the Ohio River, but in this 'fairyland of wonders' attracts no particular attention, because Nature has been so lavish of her strange sights."

TACOMA, — CITY AND MOUNTAIN.

LESSON VIII.

A LETTER FROM TACOMA.

GEORGE read a letter from a friend in Washington State. This was the letter: —

TACOMA, Sept. 24, 1890.

DEAR GEORGE, — I came here over the Northern Pacific railroad. The scenery is very grand throughout the "Rockies." I like the West better than the East. Yesterday I climbed the hills beyond the main street, for I desired to see with my own eyes Mount Tacoma, about which I had heard so much. After a while I turned and looked back, but could see nothing, for all the level land across the head of the sound was filled with a mass of vapor.

I sat down and waited; and presently mist and cloud began to shift and roll in the wind, and then to break and disappear. At last the most glorious mountain appeared that I had ever seen.

The peaks of the Rockies faded from my memory, and the snowy pinnacles of the Selkirks — even the white cone of Mount Hood — were hidden and diminished, as this white miracle of rock and ice and snow rose before me, towering nearly fifteen thousand feet above the sea that was at my feet and the level lands at its base.

Its majesty is not lessened by division of peaks. It lifts its ancient head forever above the clouds. The storm thunder rolls below the thunder of its loosening avalanches; the scream of the soaring eagle fails to pierce to the golden silence of that height; only the fires of the stars are above its icy crest. Tacoma seemed imperial, eternal, and godlike.

I had seen a mountain, I believe, unsurpassed in any other part of the world. Excuse my enthusiasm, and come out yourself to see and wonder.

Your cousin, MARY.

LESSON IX.

THE CENTRAL PLAIN AND EASTERN HIGHLANDS.[1]

"WE have already given considerable time and attention to the great elevations on the western side of our country," said Mr. Cartmell, at the next evening entertainment, "and we shall refer to them again, because they are comparatively so important. We will, for the present, turn our attention eastward. What is the next section?"

"**The Great Central Plain**," said Florence.

"Between what highlands does it lie?"

[1] In this lesson the children should have a map before them containing the names mentioned; and an outline map should hang before the class, on which the places should be pointed out as they are mentioned.

"It lies between the Rocky Mountains and the Appalachian," said George.

"What is its shape?"

"It is triangular in shape, narrow at the south and much broader at the north," was Fred's reply.

Miss Gray then told them more about this wonderful plain, stretching from the Arctic Ocean to the Gulf of Mexico, a distance of five thousand miles.

"Almost in the very centre of this plain is a 'height of land,' nowhere more than fifteen hundred feet above the level of the sea. It is the watershed for the three great river systems, — a northern, eastern, and southern. The northern and eastern parts of the plain occupy the greater portion of the Dominion of Canada.

"That portion of the plain which borders on the Arctic Ocean is called the 'barren grounds.' These 'barrens' reach their extreme southward limit in Labrador. On the west, in the valley of the Mackenzie, the forests extend as far north as latitude 68°. The greater cold of the eastern region is accounted for by the frequent northerly winds from the icy seas and by the Arctic currents. On the west the climate is influenced by the warmer winds from the Pacific. The prevalent plants of the barrens are lichens and mosses, but the hollows here and there shelter a few stunted shrubs. The absence of trees is accounted for not so much by the high northern latitude as by the cold sea winds, which sweep across and compel even the hardiest plants to crouch before the blast and creep along the ground.

"The western part of the plain has a gentle slope from the Rocky Mountains eastward. This part has been called the 'Prairie Region,' but much of it is woodland. South

A PRAIRIE SCENE.

of the River Saskatchewan, however, the plain is almost entirely a rich, fertile prairie. The southeastern region, or the basin of the St. Lawrence and the Great Lakes, is a great forest region.

"The great southern plain, that of the Mississippi, is of enormous extent. It possesses a fertility of soil and a facility of water communication which, combined with a fair climate, seem likely to make this valley 'the wide-spreading cradle for the development of future civilization.' Some of the northwestern districts, through which run the Missouri and the Yellowstone Rivers, are dry and partly desert.

"Again, the southwest region is occupied by the celebrated 'Staked Plain,' so called because the route across was marked by stakes in the days of Spanish occupation. This steppe is entirely destitute of wood, and except after the slight rains, of every other kind of vegetation. It has an elevation of over three thousand feet.

"The north-central portion of the plain between the Missouri, the Great Lakes, and the Ohio River consists almost entirely of great fertile grassy plains, destitute of trees. These plains are called **Prairies**, from the French word for a 'meadow.' Occasionally they are flat; usually they are undulating, and are then called *rolling prairies*. The grass grows high, and when seen from a small elevation, waving in the wind, gives the prairie the appearance of a great ocean, only that the billows are green instead of blue."

Mr. Cartmell then read the following bright description of this part of the country: —

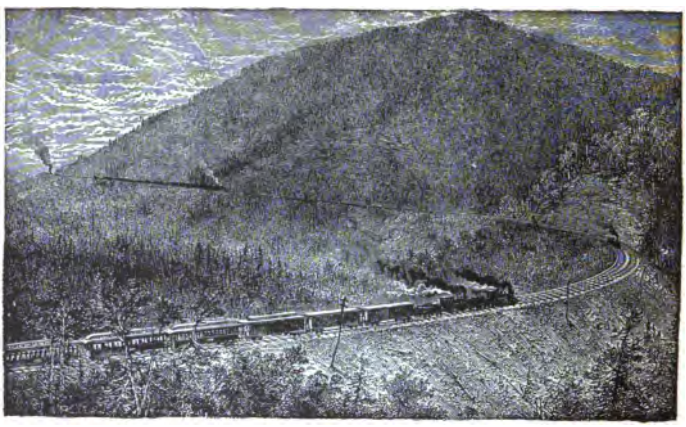
"'The attraction of the prairie consists in its extent, its carpet of verdure and flowers, its waving surface, its groves, and the fringe of timber by which it is surrounded.

Of all these the last is the most expressive feature; it is that which gives character to the landscape, which outlines the shape and marks the boundary of the plain. If the prairie be small, its beauty consists in the vicinity of the surrounding margin of woodland, which resembles the shore of a lake, indented with deep vistas like bays and inlets, and throwing out long points like capes and headlands.

GATHERING THE HARVEST ON THE PRAIRIES.

"'Where the plain is large, the forest outline is seen in the far distance like the dim shore when beheld a long way off on the ocean. The smaller prairies often resemble parks in which art has added to the work of Nature. The eye sometimes roams over the green meadow without discovering a tree, a shrub, or any object in the immense expanse but the wilderness of grass and flowers; while at another time the prospect is enlivened by groves, resembling in the distance islands, or by a tree standing alone in the blooming desert.

"'In the spring the ground is covered with a carpet of delicate green, dotted with small and beautiful flowers. In the summer it is covered with a long, coarse grass, which soon assumes a golden hue, and waves in the wind like a ripe harvest. Taller and more gaudy flowers now display their brilliant colors upon the green surface. The harvest of grain is threshed by machinery in the fall.



IN THE ALLEGHANY MOUNTAINS.

"'In the winter the prairies present a gloomy and desolate appearance. The fire has passed over them, consuming every vegetable substance, and leaving the soil bare and the surface perfectly blank. The southern and eastern portions of the plain are in parts well wooded, and everywhere well watered, rich, and fertile.'

"We shall learn more about this plain when we study the great rivers which cross its wide slopes.

"What elevations border the central plain on the east, Fred?"

"The Appalachian. What does that word mean, Father?"

"I don't know. It was first used by De Soto to include all the elevations of North America in the East."

"Is n't Alleghany a better word?"

"Alleghany is a good word, and means 'endless;' but it is more accurate to apply that to a part of these elevations instead of the whole."

Miss Gray then asked the children to name the separate ranges in order.

"Fred may name the first three."

"The Cumberland, the Alleghany, the Blue Ridge."

"Nellie, can you give the next two?"

"The Catskill and the Adirondacks."

"To reach them, what river do you ascend, Florence?"

"The Hudson, I think."

"Can you name the next two ranges?"

"They are the Taconic in Connecticut and the Hoosac in Massachusetts."

"Are there any more ranges in the Appalachian system?"

"Farther north are the Green, the White, and the mountains of Maine."

"Another range rises north of the St. Lawrence River in Canada. The Appalachian system is broken up — washed away, perhaps — much more than the Rocky mountain system.

"It is very interesting to compare these two mountain systems. I will mention some peculiarity about the Western Highlands, and you may think of one about the Eastern Highlands."

Miss GRAY. — The Western Highlands are very high.

NELLIE. — The Eastern are much lower.

Miss GRAY. — The Western are long, and little broken.

FLORENCE. — The Eastern are divided into groups, separated by land which consists of low hills and plains.

Miss GRAY. — The Rocky Mountains have few trees growing upon them.

FRED. — The Alleghanies are covered with trees to their very tops.

Miss GRAY. — The ranges in the West are saw-shaped, the peaks sharp-pointed.

GEORGE. — The Blue Range and many parts of the Alleghany are ridges, quite level in profile; the peaks are dome-shaped.

Miss GRAY. — The Western system has plateaus and parcs between the ranges.

Mr. CARTMELL. — The Appalachians have many noted valleys between the parallel ranges, such as the Valley of the East Tennessee, Shenandoah, Cumberland, and Mohawk. Through the latter run a canal and two railroads.

"The highest point," Mr. Cartmell went on to say, "in the Blue Ridge is called Grandfather's Mountain, because its rocks were the first in the country to be lifted out of the world-covering ocean, because the profile of a man's face can be seen at one place, and because the shrubs clad in ice and snow in winter resemble the white beard of an old man.

"The Smoky Mountains divide Tennessee from North Carolina. Their highest summit is Clingman's Dome, which is several hundred feet above Mt. Washington in the White Mountains. One mountain cluster in this range

is called the Chimneys, ending in sharp, thin spurs of rock, and differing from the usual rounded, dome-like summit. The eastern side of these ranges is much more fertile than the western side.

"The Black Mountains form a short range, located in one county in North Carolina, northeast of the Smokies, but they contain a number of very lofty peaks, Mitchel's Peak therein being the highest land east of the Rockies. This peak was properly named after Professor Mitchel, who first told people that these mountains were higher than the mountains in New Hampshire. In the summer of 1857 he lost his life by falling down a precipice while trying to cross the range after dark. He is now buried on the top of the mountain which bears his name."

"What else can you tell us which is interesting, Father?"

"The Appalachian Mountains, like the Rockies, have their highest peaks at the extreme northern and southern ends of the range. Both abound in valuable mines of silver and gold, and contain many precious gems. Among the mountains in North Carolina are found valuable supplies of good timber and mines of emery. In the southwestern part of the State is a plateau four thousand feet high, where the air is so pure and balmy that it is rapidly becoming a fashionable health resort. There is plenty of good fishing and hunting there."

Miss Gray then remarked, —

"The Alleghany Mountains in Pennsylvania are not especially noted for their beauty; but they are known the world over for their valuable deposits of coal, iron, oil, and gas. I presume we shall learn more about these products another evening."

"Persons travelling," said Mr. Cartmell, "in the western part of New England, especially in Vermont, see away to the west a beautiful range of not very high peaks known as the Adirondacks. They extend from the northeast corner of New York towards its centre. The Catskills are a part of the same range; and these two unite the Green and White Mountains on the north to the Alleghany and Blue Ridge on the south."

"Are there any peaks here of considerable size?" Florence asked.

"Certainly. Mount Marcy is over five thousand feet high; two other peaks are nearly as high. The peaks assume the conical shape. The slopes of the mountains are quite abrupt, and the scenery wild and grand."

"But the great charm of the place," said George, "is in the large number of lovely lakes and rivers, easily navigable to the light canoe of the Indian, with occasional portages from lake to lake and past falls and rapids."

"The abundance of game," added his father, "has proved a great attraction to the sportsman; and tired brain-workers of all professions have for years gone to their far-away waters and forests for rest and new pleasures in the summer time."

Fred said, "Some of the enjoyments of the Adirondacks are described in the following extract: —

"'To row out on some lovely lake, by golden sands and patches of lilies, with the fragrant breath of the balsam and the pine in the air, and have the guides send the boat cleaving into a narrow opening overhung by bushes, and then in the lily-lined and gold-flecked stream of black, slow-running water to see the sweet vista broken everywhere by leaping, splashing, splendid trout! Ah, here and there they rush, cleaving the surface in hot pursuit of a dancing gnat, or jumping clear out of the brook to seize a passing fly.'"

After closing the book Fred continued, —

"If a visitor prefer hunting to fishing, he can find plenty of deer in the Adirondacks, but bears are more common than deer. Not long ago a very large one was

AU SABLE CHASM.

seen near Ogdensburg, and tracked into the heart of the Adirondacks. Mr. Lewis, one of the popular guides, succeeded in getting near the bear, and firing upon him when only eight rods away, the ball taking effect in his shoulder.

"Bruin rose up on his hind legs, and started for the man who shot him, roaring with rage. Mr. Lewis succeeded in firing six successive shots from his Winchester rifle when retreating, all of which took effect. Mr. Lewis stood hemmed in on all sides, so that it would have been extremely difficult to effect his escape, had not the last shot produced the desired result. The bear weighed when dressed nearly five hundred pounds, and was justly named by the guide and those who have seen him as the 'Jumbo among bears.' He must have been twenty or twenty-five years old."

"One of the most pleasing parts of the Adirondacks is very near Lake Champlain, and is reached from Burlington by steamer across the lake and then by a stage ride of a few miles.

"A small river, rising on each side of Mount Marcy, flows into Lake Champlain near Port Kent. A few miles from its mouth this river falls suddenly about sixty feet, and then enters a deep and narrow chasm nearly two miles long. In this part of its course it affords many striking and picturesque views, one of which George will now show us."

"Do people go through the chasm?"

"In summer there is not very much water in this stream, and visitors can walk beside the water most of the way. They then take a boat-ride for the rest of the distance. I visited Au Sable Chasm a few years ago, and found that its beauties had not been overestimated."

"I have a word or two more to add before we close the evening's talk. It is founded on my own happy experiences.

"Many parties go to the wilderness to camp out. Camp-fires are seen burning during the summer months beside Lakes Saranac, Placid, Mirror, Tupper, Swan, and Blue Mountain. The Delaware and Hudson railroad now takes the traveller into the midst of all this beautiful scenery. The fresh, dry air is full of tonic, and life outdoors renews the appetite so as to call for Gad's celebrated rule: 'Never eat too much at any one time, and then you will be able to eat a great deal all the time.'"

LAKE PLACID AND MIRROR LAKE.

LESSON X.

A PRAIRIE-DOG VILLAGE.

EDWARD B. NEALLEY.

ONE night a band of Indians attacked us,
  Crossing the Rocky Mountains once by stage,
And left us horseless in a waste of cactus
    And parched wild sage, —
A desert region, dreary desolation,
  Where never flower bloomed or grass grew green,
As if accursed of God from the creation
    The land had been.

Yet here, remote from man, unused to tillage,
  Afar from human joy and human strife,
We walked the roadsides of a thrifty village
    Of busy life,
And saw the people resting from their labors, —
  Snug houses theirs, well filled with winter stores, —
And matrons, chattering gossip with their neighbors,
    Stood at the doors.

"The little prairie-dog here builds his burrow,"
  Our driver said, "and here the rattlesnake
And solemn owl, helpmates in joy and sorrow,
    Their dwelling make;

And in these burrows, snug in every weather,
Secure each one in all his rights, the three,
A happy family, consort together
In unity.

"The snake, strong-armed and fierce, keeps out the stranger;
The owl, Minerva's bird, sage counsel gives;
And so the prairie-dog in haunts of danger
In safety lives.
And, all unfettered by your laws of iron,
Each lending cheerful help, their homes they build;
Together thus lie down the lamb and lion,
God's word fulfilled."

LESSON XI.

AIR AND VAPOR.

"Do you know, children," said Mr. Cartmell, "that wherever we go we are all the while taking in and sending out from our lungs something which we call air? From this we learn that the air is around us everywhere. It is air that we force out of our mouths and lungs when we blow so as to make a leaf or piece of paper move; and the wind that sways the branches of the trees, and sometimes blows our hats off our heads, is only air moving along very quickly.

"The air extends to a great height above our heads, and forms a large *sphere*, which incloses the smaller sphere

of the earth much in the same way as the outer leather covering of a base-ball incloses the inner part. Hence the whole body of the air is called the *atmosphere*, which word means the *vapor-sphere*.

"It is very important to know about the atmosphere, also because it has a great deal to do with the clouds, rain, snow, and winds, about which we are going to read later on."

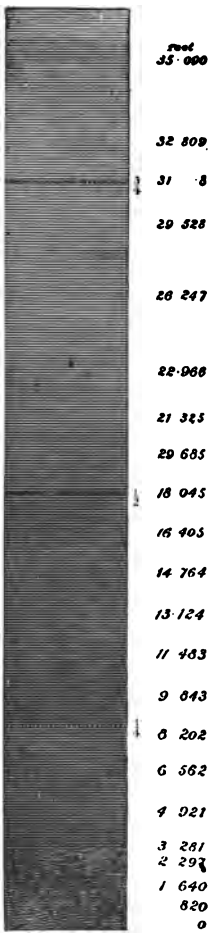
"Is there anything in the air, Papa?"

"If we breathe upon the window-pane, or any other cold thing, we see that the place on which we breathe becomes quite moist. The reason is that there is always *vapor* in the air which we give out when we breathe, though we do not often see it. But the greater part of the air is made up of some other things which we cannot see, and which are called *gases*.

"There is a great deal of difference between that part of the air which is near the surface of the earth and those parts of it which are high above us. Persons who climb very lofty mountains find it more and more hard to breathe the higher they climb. Persons who have gone up high in balloons have also found it hard to breathe; and if they had risen very much higher above the earth, they would no doubt have died. The reason of this is that the air gets lighter, or thinner, the higher we go; and as each breath taken fills the lungs with only this thinner air, we are obliged to breathe more rapidly in order to get enough air to keep us alive.

"Even the air near the ground *feels* light; yet it is pressed down by the weight of all the mass of air above our heads, for each part of the air has to bear the weight of all the air above it. The higher we go, the less weight the air has to bear."

"Another interesting fact," continued their father, "is that air expands when heated, and contracts by cooling. Suppose we take a bladder half-filled with air, and tie the neck so that none of the air can get out. If we place this bladder in front of a fire, we see that it soon begins to swell, because the air inside takes up more room when hot than when cold. If we keep it near the fire long enough, the air will quite fill the bladder; and then, wanting still more space as it grows hotter, it will press more and more against the inside, until the bladder at last bursts with a loud noise. But if we have a bladder which is quite filled with hot air, and we take it into a cold place, the bladder slowly shrinks, as the air inside becomes chilled."



DENSITY OF THE AIR.

"What does that show us, Papa?"

"It shows us that air when it is heated expands, or takes up more room; and when it is cool it contracts, or takes up less room. But as air expands it becomes lighter and thinner, and as it cools it becomes heavier and denser. If a cork and a stone be placed in water, the cork, being lighter than an equal bulk of water, rises to the top; while the stone, being heavier than an equal bulk of water, sinks to the bottom. So when one part of the air is made

hot, and therefore light, the cold and heavy air about it pushes up the light air, as the water pushes up the cork.

"A balloon rises in the air because the gas with which it is filled is lighter than the gases which make up the air near the ground."

"What is meant by the term 'temperature'?" asked Fred.

"When we wish to talk about the coldness and the warmth of anything, we often use the word *temperature*. When a thing is cold, we say that its temperature is *low*; and when it is hot, we say its temperature is *high*. In the same way we call changes from being hot to being cold, or from being cold to being hot, *changes of temperature*.

"As the air gets almost all its warmth from the earth, we can see that its temperature must change whenever that of the earth changes. But this is always changing, and so the air is always moving.

"The moisture in the air also expands and rises when it is heated, and contracts and falls as it grows cold. When a kettle of water is placed upon the fire the water quickly gets hot, and as soon as it begins to boil we see coming from the spout a vapor, which we call *steam*.

"A very little water forms a great deal of steam. If we were to stop up the kettle-spout and fasten down the lid, so that no steam could get out, and were then to place the kettle on the fire, in a very short time the steam would burst the kettle."

"Can you show that steam is water?"

"We can soon prove that steam is only a form of water by holding a cold plate or a cold piece of glass in it. In a short time we shall find the plate or glass covered with little drops of water; this is only the steam that has been

chilled and turned into water again. In the same way the vapor in our breath turns into water when we breathe upon the cold window-pane.

"Now, the greater part of the surface of the earth is covered with water in the form of oceans, seas, lakes, and rivers. Besides this, the land itself is often full of moisture from the rain, snow, and dew which fall upon it. The heat of the sun turns a great deal of this moisture into vapor, which rises and mixes with the air, and makes it lighter. This light, warm, moist air rises more rapidly than air which is quite dry, and thus this vapor causes more movements of the atmosphere than would take place if it were not present."

"Please tell us some more about these changes," pleaded Florence.

"The change of water into vapor is called e-*vapor*-ation. It is always taking place in most parts of the earth, as we have just shown.

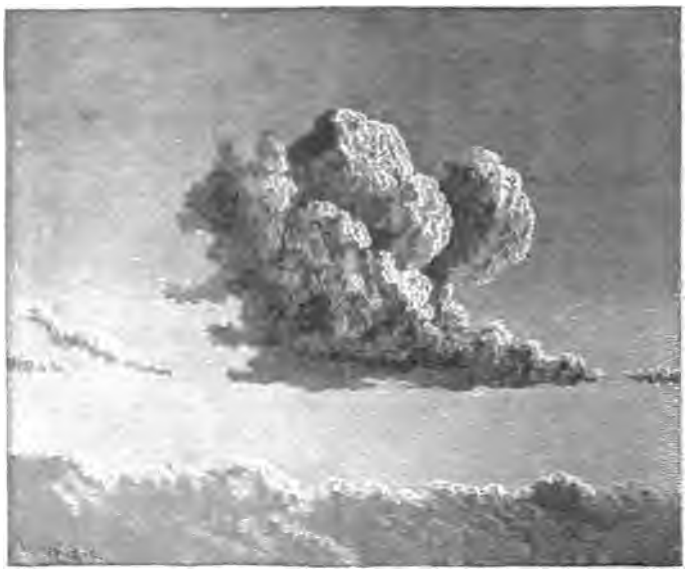
"The changing of vapor back into a liquid, or water, is called *condensation*, because the vapor becomes nearer a solid, — that is, the particles of matter are brought nearer together. Condensation takes place whenever vapor is much chilled. When a current of warm air containing much vapor rises from the surface of the earth, it soon reaches a colder region of the atmosphere. Then its vapor begins to condense, and takes the form of *clouds*. Indeed, a cloud is only a mist hanging in the air instead of resting on the ground."

"I never thought of that before."

"We can often see for ourselves how the clouds are formed. If we were in a mountainous country during the summer-time, and were to get up very early in the morn-

ing, we should very likely see the fields covered with a mist, or fog.

"As the sun's rays become warmer, the mist begins to evaporate, and after a little while we see it no longer. It has risen in the form of vapor into the air above us. If



CLOUDS.

we look at the grass, we notice that there is a great deal of dew left behind, which sparkles in the sunlight. As the sun's rays become still warmer, their heat changes the dew into vapor, and at last the grass becomes quite dry. And now when we look up we see that clouds have been forming in the sky, — small and thin at first, but growing into thick, white masses as the day advances.

"Clouds are frequently seen to form about high cliffs near the sea, and around mountain peaks. These clouds are formed of the dew and fog which were evaporated by the sun. The vapor from them has risen into the colder regions of the atmosphere, and has been again changed into mists.

"When the heat of the day is over the warm vapor ceases to rise, and the clouds begin to grow smaller and to sink earthwards. As they come lower they reach warmer air, and the mist which they contain is again turned into vapor."

CLOUDS CONDENSED BY CLIFFS.

LESSON XII.

THE WHITE MOUNTAINS.

AS most of the members of the travelling club had visited this mountain region during the previous summer, they had a good deal to tell about what interested them.

Mr. Cartmell began by saying, —

"These mountains are often called the 'Switzerland of America.' They are situated in the north centre of the State, and are visited by thousands of tourists every summer. Beautiful and attractive as they are, they fall far below the Rocky Mountains in grandeur, and they are far inferior to the European Alps in variety, picturesqueness, and real mountain beauty.

"The White Mountains contain the highest elevations in New England, and in this part of the Appalachian range. They comprise two clusters, or groups, of peaks, the White and Franconia Mountains.

"These mountains are frequently approached through North Conway, on the south. One of the finest distant views of Mt. Washington is from the Conway Meadows.

"Coming nearer to the mountains, all travellers must pass up through the Notch, between the guardian peaks, Mt. Willey and Mt. Webster. These two mountains seem torn apart to allow river and road to make their way through. The natural gate of the Notch is in one place only about twenty feet in width. Passing through between

MT. WASHINGTON AND THE RAILROAD.

the lofty cliffs, the traveller comes into the cheerful sunshine of a little plain, on which stands a fine hotel. A few miles beyond this hotel, known everywhere as Crawford's, Fabyan's is reached, where another fine view of the highest peak of the White Mountains is obtained.

"A few miles from this latter great hotel the peculiar railroad to the summit of Mt. Washington begins its remarkable route. It has been in successful operation now so long it seems a little strange that when Mr. Marsh,

the inventor, applied to the legislature for a charter a member moved, in sarcasm, that this inventor have leave to build a railway to the moon."

George then described the railroad up Mt. Washington:

"In the construction of the Mt. Washington railway, the outside rails are the ordinary T rail. Between them is a third one, a cog-rail, most thoroughly built. Its outside, or the frame in which the cogs are held, is a little higher than the cogs. Take two pieces of thin board and make a miniature ladder, and lay it upon the roof of a building, and one will get an idea of this third rail, which is the principal characteristic of this mountain road. It is clearly shown on page 83. This cog-rail is bolted fast to timbers, or ties, and into it work the teeth of a large, strong cog-wheel on each driving-shaft of the locomotive, the boilers of which are inclined forward, giving the machine a broken-back appearance.

"Of course, the car is drawn up by the cog-wheel, forced on by steam power. There are brakes and safeguards enough to hold a train at any position, and no serious accident has ever yet happened on this road. But one car is attached to an engine, and the car is pushed up, but follows the engine on the downward passage. The road is three miles long, the rise thirty-six hundred and six feet, — an average of one foot in four; the steepest grade is nineteen hundred and eighty to the mile, or thirteen and a half inches to the yard. The running time up and down is about the same, an hour and a half including stops.

"People sometimes slide down the third rail on a common board three feet long, provided with suitable brakes. A writer thus describes the operation: —

"'As we were standing by the track, a young man, apparently a mechanic, came out of the hotel with a piece of board and two round sticks, each a foot and a half long. The board he laid upon the rail, and attached the sticks to it, one on each side, by means of an iron bolt, and

SLIDING DOWN MT. WASHINGTON.

dropped the other ends upon the ties. He then brought an axe, seated himself on the board, braced his feet against a strip, which may have also secured the iron bolt, put the axe between them, picked up the handles (brakes), and then, like the foreign merchant with the steam leg, "in less than a minute was out of sight." Down the rail he went, swift as a bird flies. It was all done so quietly and quickly that those standing near him had no idea of what he was doing until he flew away from them. His

rate of speed we know not, but it is said that persons have gone the whole three miles of this road in three minutes.'"

Florence, who went to the top of Mt. Washington on the railroad the year before, said: —

"The summit of Mt. Washington is visited each year by over fifteen thousand persons, a large part of whom ascend by the railroad. A person can now leave Boston, say July 3, in the evening, and reach the top of this mountain the next forenoon, and return to Boston in the evening of the same day, July 4. The Summit House is quite a large hotel, with all modern conveniences. In the Tip-Top House a daily paper, called 'Among the Clouds,' is printed for three months each year.

"From the top of Mt. Washington very distant views are obtained on a clear day. Some of the important points seen are the great forests to the north; the deep valleys through which flow the Connecticut, Merrimac, Saco, and other rivers; the numerous lakes in the distance and the Lake of the Clouds near by; the white, palace-like Glen House at the base of the mountains; the notched wall of the Green Mountains to the west; and the ocean far away near the horizon in a southeastern direction."

Miss Gray told her experiences in mountain-climbing from Jefferson, her favorite summer home: —

"What is called the 'Presidential Range' of peaks can be best seen from this town of Jefferson. Looking up a broad valley lying between Starr King Mountain and Cherry Mountain, the visitor sees, on a clear day, a fine mountain profile. Quite a good view is seen above Crawford's Hotel, the distance to the top of Mt. Washington

being over seven miles in a straight line. I never see this range of mountains without recalling Starr King's lines, —

PRESIDENTIAL RANGE.

"'The mighty pyramids of stone
That, wedge-like, cleave the desert airs,
When nearer seen and better known,
Are but gigantic flights of stairs.
The distant mountains that uprear
Their solid bastions to the skies
Are crossed by pathways that appear
As we to higher levels rise.'"

Miss Gray asked Fred if he saw any pretty villages about the White Mountains.

"One of the largest and most beautiful villages in this region is Bethlehem, situated on a slight elevation, and commanding a magnificent prospect of mountains and valleys. From no other village are so many mountain peaks visible at once. This place is the summer home each year for thousands of tourists. It is the Saratoga of the mountains."

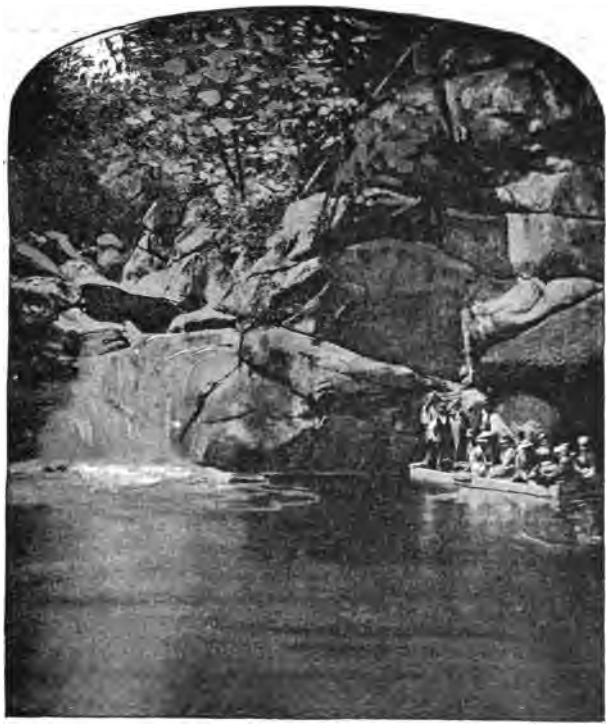
OLD MAN OF THE MOUNTAIN.

Mrs. Cartmell expressed her preference for a different part of the White Mountains by saying, —

"No one should forego the pleasure of finishing up a tour of the New Hampshire Alps by a short visit to the Franconia section. The headquarters will be, of course, the Profile House, near which is Echo Lake and Eagle Cliff. From the centre of this mountain lakelet is heard a remarkable echo, the sound being repeated over and over as it is thrown from side to side. When a cannon is fired, a deep, hollow, rumbling sound is heard, as though the mountains were splitting their sides with laughter."

"What do you remember about your visit, Nellie?"

"I remember that a short distance south of the Profile House is a little lake beside the road. If you look up at the mountain opposite in passing this lake, strange to say you will see the remarkable profile of a face which is called the Old Man of the Mountain. He appears to be



THE POOL.

looking down into the lake from a height of twelve hundred feet.

"The face is quite perfect, and is produced by the happy position of several crags, one above another. It measures on the cliff about forty feet."

"When first seen," added Fred, "hundreds of years ago, reflected from the lake, by the thirsty Indian as he stooped to drink, how startling the impression must have been!"

THE FLUME.

"I, too, like the Franconia Mountains," said Miss Gray, after Fred finished.

"A few miles farther south are situated, near together, the Basin, the Pool, and the Flume. The former has been worn out of solid granite by the grinding of the rough pebbles when the brook is very high in the springtime. There is a strip of granite projecting into the basin in such a way as to resemble closely a human leg and foot cooling itself in the stream.

"The Pool is much larger than the Basin, and receives at one end a large cascade of sparkling water. This is so clear the bottom is distinctly seen, paved with various-shaped pebbles. An old man with a flat-bottomed boat is generally ready to carry visitors around the huge well.

"More remarkable is the Flume, — a long, narrow gorge cut for several hundred feet across a rugged hill so as to become the bed of a mountain stream. The smooth, perpendicular walls are constantly wet with tiny streams, which furnish moisture to ferns, mosses, and delicate flowers. The lower part of the gorge is paved with broad ledges of granite, made smooth by the constant flow of clear, cool water."

LANGUAGE LESSON.

Write about the White Mountains, using the following topics as sub-divisions: —

1. The "Switzerland of America."
2. The Notch.
3. Mt. Washington Railroad.
4. Sliding down the railroad.
5. The Summit of Mt. Washington.
6. The Franconia Mountains and Views.

LESSON XIII.

RAIN AND WIND.

"I WISH to learn something about rain," said Nellie.

"I will try to help you understand it," said her father.

"Only a part of the vapor rising from the earth returns to it in the form of mist, fog, and dew. By far the greater portion of it falls in the form of *rain*. If we go out when there is a thick mist all around, we see that it covers our clothes with a great number of very tiny drops of water.

"These little drops of water are so small and light that before they settled on us they floated about in the air and formed the mist. Just in the same way little drops float about high up in the air and form clouds. If the air becomes colder, the clouds also grow cold, and then these tiny drops become larger. These larger drops, being too heavy to float in the air as mist, begin to fall upon the earth, and so we have a shower of rain."

"How is rain made?"

"Rain is produced in several ways. When a moist wind blows across land colder than itself, its vapor is condensed, and falls as rain.

"Sometimes a warm, moist wind travels along until it meets a range of mountains, and as it cannot blow through them, it is forced to rise up their sides until it reaches their tops. It then blows over them. But as it rises, it

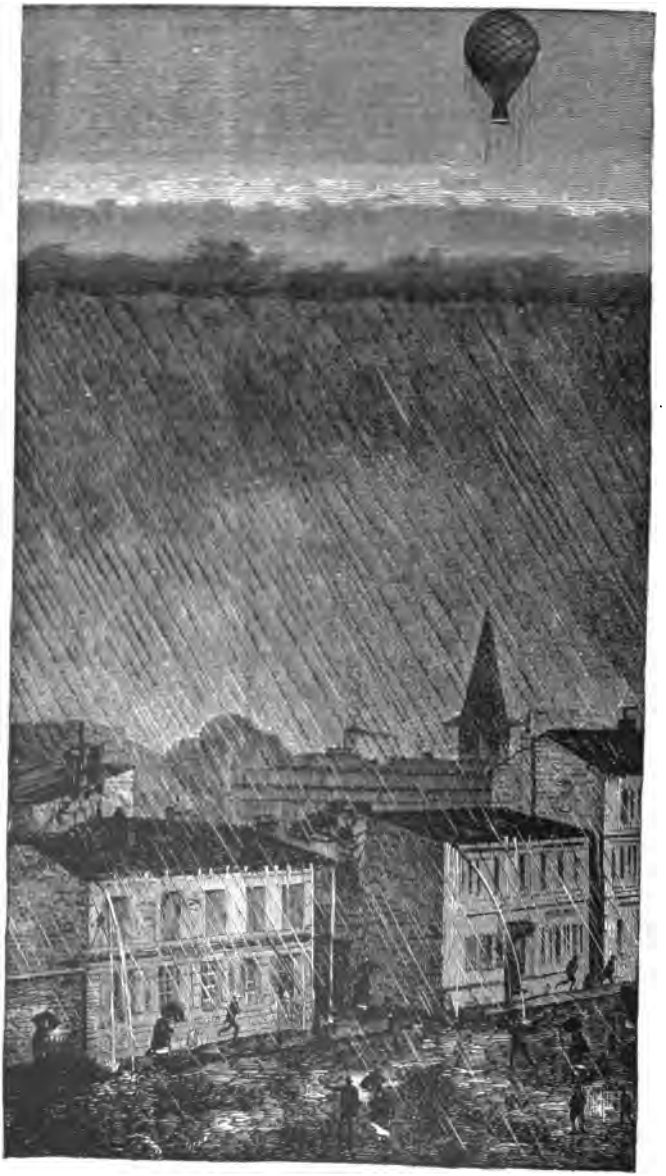
contracts and grows colder, and its vapor is soon turned into mist, which, if cooled still more, falls down as rain upon the hillsides and valleys.

"At other times a cold wind — which, being heavy, keeps close to the ground — forces its way beneath a stream of warm, moist air, and condenses some of its vapor; at the same time the moist air, being thrust up-

VAPOR CONDENSED BY A MOUNTAIN.

ward by the wedge of cold air below, comes into a cold region, where its vapor is soon condensed into clouds and rain.

"When a country is level, unless the air of the country is colder than the winds, no rain will fall, although the winds may be full of vapor. But, as we have just read, mountains force the wind upwards into colder regions, where its vapor is condensed into the mists and clouds which so often cover the peaks and sides of a mountain range. These mists and clouds descend into the valley as



A SHOWER.

rain. Hence it is that in those parts of a country which are hilly much more rain falls than in those parts which are flat.

"The picture opposite shows very clearly the formation and fall of rain. The clouds are not usually more than a mile above the earth, — in a shower often much less than that distance. Above them may be a balloon or mountain peak in bright sunshine.

"One of the important offices of rain is to wash the air. If a small quantity of rain, gathered from an open space in a town, is boiled down to dryness, and the remainder placed under a magnifying glass, it will show, as in the illustration, the dust and soot contained therein."

"What is wind?"

"*Wind is air in motion*," replied Mr. Cartmell. "Air is put into motion by the changes of heat and cold. When a fire is lighted in a grate, it soon warms the air in the chimney. This air takes up more space when warm than when cold, and therefore some of it must flow out at the open chimney-top. The warm air in the chimney is then lighter than the air in and about the room. This air then rushes to the fireplace, and lifts the lighter air out of the chimney. And so a stream of air is kept up which is called a *draught*, because it seems to be *drawn* towards the fire.

"If a great fire were lighted in the open air, where there was no chimney, much the same thing would happen. Streams of cold air would rush towards the fire, and streams of hot air would rise from the fire.

"In fact, so long as one place is hotter than another

the air will not be still, but will move and produce *wind*. The cold air, being heavier bulk for bulk than the hot air, will flow under it, and thus a stream of cold air will sweep over the ground; and in the higher parts of the atmosphere the warm, light air will flow over the denser air, and thus produce an upper current.

"The air is moving in this way all over the world, but it does so to the greatest extent in those parts which lie near to the *equator*, — that is, midway between the two poles. There the sun's rays have most power, and so there the greatest amount of air is heated and the most vapor formed. The warm air is lifted up and the cold air is always rushing to this heated belt from the north and from the south. For this reason the winds on one side of the equator blow from the north, and on the other side from the south."

"But what becomes of the heated air and vapor which rise at the equator?"

"They rise into the colder regions of the atmosphere. There this great upward stream of air and vapor divides, one part passing to the north, the other to the south, to supply the place of the cold air which has all the time been streaming to the equator.

"By the time the northern stream reaches our country it has come to the surface of the earth again, and forms the south, or southwest, wind which sometimes blows here. Being warm and laden with vapor, it brings rain; and so it is of considerable use in watering the ground, and making it fruitful.

"Sometimes we can *see* that there are upper and lower currents of air; for while we feel the wind blowing *from* the south, we see the clouds moving *towards* the south; or perhaps the lower clouds are moving one way, while the higher clouds are moving another.

"As some winds are warm and others cold, some moist and others dry, they make hot or cold, wet or dry, the land across which they blow. There are, in fact, two kinds of work done by the winds. First, they cause changes of temperature, — that is, changes of heat and cold, — and then they carry about and scatter moisture. If there were no winds, the vapor which rises out of the oceans and seas would hang above them in clouds, and fall down into them again as rain, and would not reach the land. The ground would then become parched, so that no animal or plant could live on it."

"Do winds carry moisture with them?"

"The moisture which rises out of the soil forms only a very small part of the rain which falls upon it. Most of the rain is formed from the vapor of the ocean. The winds carry this vapor over the land, where it takes the

form of clouds, mist, or rain. Much of the rain which falls upon the land sinks into it; the rest finds its way into the rivers, and so back again into the oceans. There it is once more evaporated, and then carried by the winds to water the land afresh. But winds do not always bring

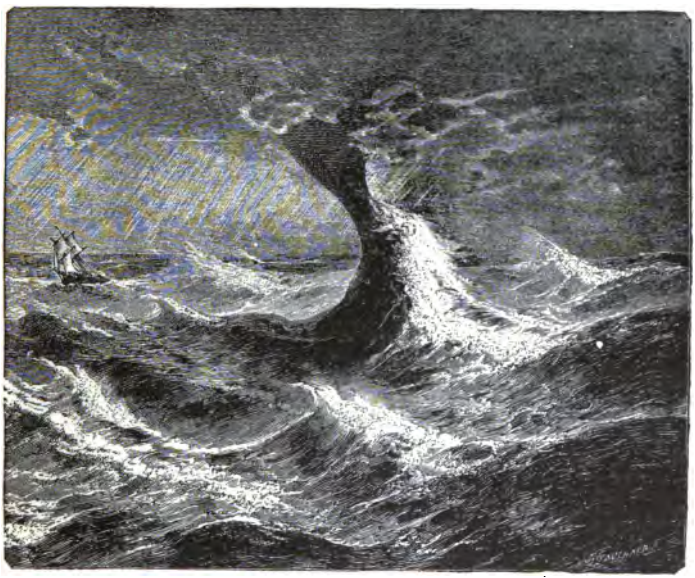
WHIRLWIND.

rain, and after heavy showers they are often of great use in drying the soil.

"Winds do more than this. When a wind blows from a hot country, it carries warmth with it to colder countries, and often makes them more pleasant to live in. On the other hand, a cold wind tends to cool those places where the air is very hot."

"What good do winds do?"

"Besides both cooling and warming us, they bring us pure air and refreshing showers, and in many other ways promote the health and growth of plants and animals. At times, as we all know, the wind is very strong, and we have what we call a *storm*. Storms often do a great deal of



WATERSPOUT.

damage, both on sea and on land. They destroy ships, and sometimes all on board are drowned; and on land they blow down trees and houses. Yet even storms do much more good than harm. They blow away all the bad air and fog and smoke which hang about our large towns. Even in the country, where the air is fresh, we may notice how much sweeter it seems after a storm.

"We should not shut the winds and breezes quite out of our rooms or houses or schools. If we do, we shall become pale and weak and sickly. Through not knowing this, or not attending to it, many persons die every year, and many more live in pain and misery."

"Papa, what are waterspouts?"

"They are a kind of whirlwind in the air. In place of dust and leaves and other solid substances being drawn up, they carry up water, as clearly shown in the picture now before you. It is in this way that fish and frogs are sometimes taken up and carried great distances, to fall upon the earth in showers."

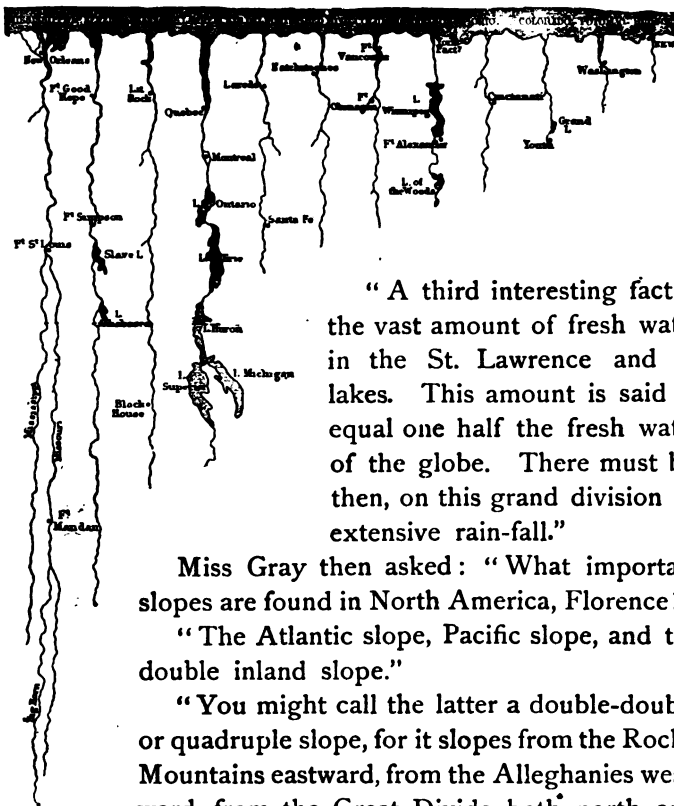
LESSON XIV.

SOME NOTED RIVERS.

"SEVERAL interesting facts are noticed," said Mr. Cartmell, "in looking at a map of North America, in reference to the distribution of water on the surface. In the first place, nearly all the great rivers in the country rise very near one another at the base of the Rocky Mountains. The centre of this great watershed is about where the Rocky Mountains enter British America from the United States. By consulting the map the truth of the statement is soon seen.

"In the next place, a person with good eyes will see on the map a long semicircle of great lakes and gulfs stretching around Hudson Bay as a centre from the Atlantic to

the Arctic Ocean. This immense chain of lakes begins on the north with Great Bear Lake, and ends with Ontario and the Gulf of St. Lawrence. It doubtless marks the ancient shore of the ocean, which was forced back by the rising continent.



"A third interesting fact is the vast amount of fresh water in the St. Lawrence and its lakes. This amount is said to equal one half the fresh water of the globe. There must be, then, on this grand division an extensive rain-fall."

Miss Gray then asked: "What important slopes are found in North America, Florence?"

"The Atlantic slope, Pacific slope, and the double inland slope."

"You might call the latter a double-double or quadruple slope, for it slopes from the Rocky Mountains eastward, from the Alleghanies westward, from the Great Divide both north and south. What do we observe in looking at a map of these slopes, or better still, when travelling over them?"

"We see great rivers running down-hill," said Nellie.

"Has the length of the slope anything to do with the river?"

"It determines largely the size of the rivers."

"What else influences the size?"

"The amount of rain-fall.

CROSSING THE YELLOWSTONE.

"America, situated between two seas, is well watered. An enormous plain, bordered by mountains on the east and west, open to two seas on the north and south, naturally suggests great rivers flowing down from the mountains on both sides, and finding their way directly or indirectly to the oceans."

"What is the *longest* river in the world?" Mr. Cartmell inquired.

"The Missouri-Mississippi, which is from forty-two hundred to forty-four hundred miles in length."

The comparative length of some of the important rivers of North America is very clearly shown in the cut on page 99. Notice how short the Hudson is compared with the Mississippi, or even the Ohio.

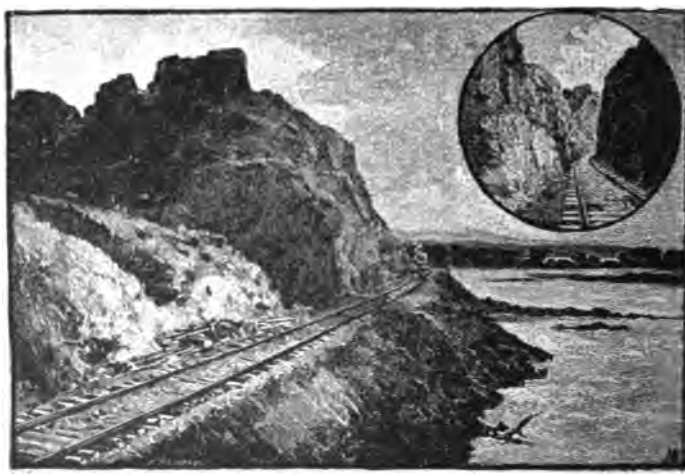
George then threw upon the screen a map of the Mississippi Basin.

MISSISSIPPI BASIN.

"Notice," said his father, "the enormous extent of this single river system, embracing an area of one and a quarter millions of square miles, or more than equal to the whole extent of Europe excepting Russia, Norway, and Sweden.

"The Yellowstone Valley, near Fort Keogh, is beautiful and fertile. The river is crossed by ferries. The swift current of the river is used as a motor to propel the heavy, flat-bottomed ferry-boat from one side to the other.

"The scenery on the Northern Pacific just beyond Glendive along the Yellowstone is most imposing. The railroad skirts the river, and the bluffs rise several hundred feet above the track. In some places great cuts were necessary for the road bed. The road follows the valley of the Yellowstone for a long distance."



YELLOWSTONE RIVER, NEAR GLENDIVE, MONTANA.

"Where does this great Mississippi River rise?"

"Which branch do you mean?"

"Please give the source of each."

"The Upper Mississippi rises in Lake Itasca, or a small lake just beyond the former. The Missouri rises in the Rocky Mountains."

"The double source of this branch is near the foot of Frémont's Peak and in the National Park. The Yellowstone Lake, one of the sources, is nearly eight thousand

feet above the mouth of the Mississippi. The Missouri River descends vertically near Fort Benton about eighty feet, making a handsome cataract.

"The current is very swift in this river, and the course of the river is constantly changing. It is navigable for most of its course. The water is very muddy, as it flows

THREE FORKS OF THE MISSOURI.

through a rich, alluvial soil. The name Missouri means 'muddy.'"

"Is the river straight, like the St. Lawrence?"

"It is one of the crookedest rivers in the world, on account of the yielding soil which forms the bed in a large part of its course.

"At Vicksburg the river makes a very decided turn in its course, called the 'Great Bend.'" (Shown on the next page.)

"How far is the Mississippi proper navigable?" Mr. Cartmell asked.

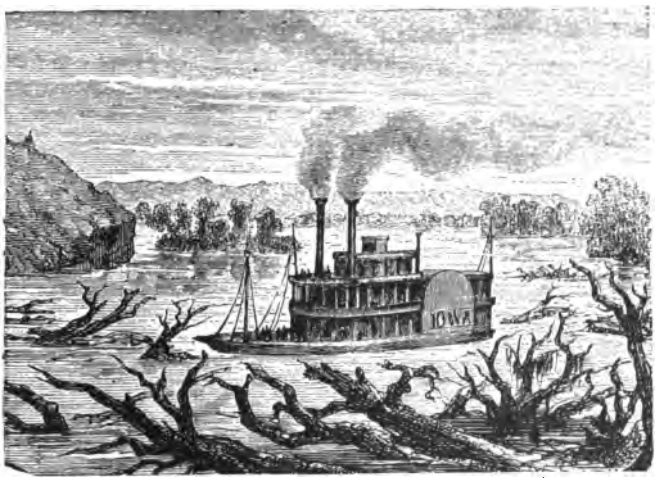
"To the Falls of St. Anthony, near St. Paul."

"The upper part of this river is bordered by high, steep bluffs, which are the margins of the flat prairie level. From these bluffs there is always a fine view of the river. Farther south the bluffs disappear, and the banks become low and liable to overflow in springtime. In the spring, when the river is full of water, the water is frequently higher than the tops of the houses on some of the plantations.

"The Lower Mississippi is subject to great floods, which often overflow extensive districts of country, carrying ruin and destruction to the plantations on the banks. To prevent such disasters, there have been built artificial banks, or levees, to confine the water in its lawful channel. These are frequently broken down; and the water rushes through and covers the land several feet deep, drowning cattle and human beings."

"When you went up and down the river, Mr. Cartmell, did your steamer have any trouble with snags?"

"Sometimes; for in its course the Mississippi, like other great rivers of the West, is continually gathering into its current numbers of trees that fall into the stream as the



UPPER MISSISSIPPI.

banks upon which they grow are undermined. Swept along by the great floods, they are frequently left in the main channels, their roots fixed to the bottom, and their tops swaying up and down from the motion of the current."

"Please tell us something about the lower part of its course."

"At New Orleans the river is one and a half miles wide. Below the city are many large sugar plantations near the river. Farther down are many gardens, which

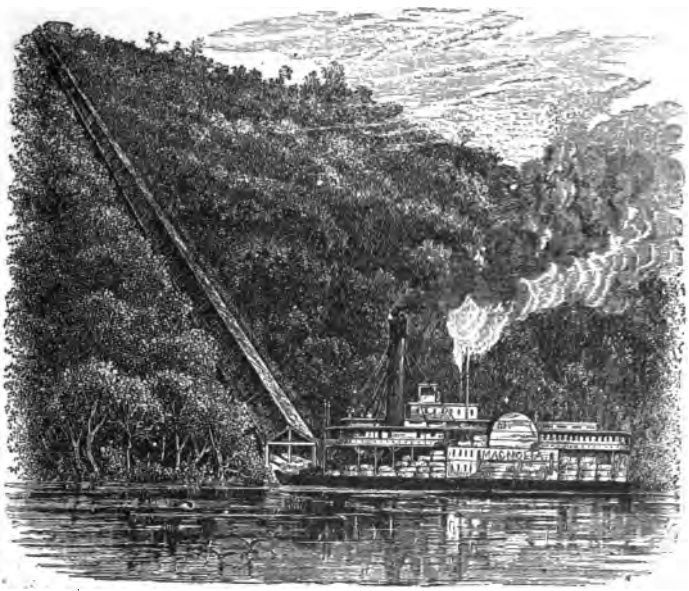
supply the city with vegetables. Beyond these the scenery is very monotonous.

"The river finds its way to the Gulf of Mexico through three different channels, known as passes. Just before its subdivision it is one mile and three quarters wide and

MAP OF LOWER MISSISSIPPI.

forty feet deep, and carries down seventy-two million cubic feet of water every minute. Every cubic foot of this vast volume of water contains nearly two cubic inches of sand and mud, which is deposited in the gulf, forming shoals or bars to the passes. The crests of these bars are from two to five miles from the land.

"For many years attempts were made to lower the bars by dredging. In 1875 it was resolved to endeavor to narrow and increase the flow of water in the South Pass, the central and smallest channel, so that the current might scour for itself a deeper bed along the pass and through the bar beyond the pass.



LOADING COTTON ON THE MISSISSIPPI.

"The works for deepening the South Pass and removing its bar consist of embankments, or jetties, as they are called, built at the head and mouth of the channel. The jetties at the head, or point where the river divides, serve both to narrow the entrance and to turn off a portion of the current from the other passes. The jetties at the mouth

extend the narrow current towards the bar. The result is an increased speed in the current, which has scoured for itself a deep channel in the pass, and has considerably lowered the bar, to the great improvement of navigation. Where the channel was four feet deep it is now thirty."

"If George should climb," said Miss Gray, "to the top of the lighthouse at the South Pass, he would look out, not over a landscape or a waterscape, but over a mixture of both, — water, mud, reeds, and alligators. Fourteen and a half miles to the east lies the low green bank of the Eastern Pass, and as many miles to the west is the South-west Pass. A lighthouse stands at the mouth of each of these passes."

Mr. Cartmell then concluded by saying, —

"This is one of the busiest rivers in the world. With its branches it is navigable fifteen thousand miles. It has fifty-seven large branches. Three thousand vessels are constantly passing over its muddy waters. Most of these vessels are steamers, loading cotton or carrying wheat. A French writer once said of this part of the country, 'Upon the whole the most magnificent dwelling-place prepared by God for man's abode.'"

LANGUAGE LESSON.

1. Write a description of the Mississippi River, telling what you have learned about its source, basin, length, course, bluffs, levees, and jetties.

2. Compare the Mississippi with the St. Lawrence, or any other river.

LESSON XV.

OTHER RIVERS.

"WHAT is the largest river flowing into the Pacific, George?" asked Mr. Cartmell.

"Some persons call the Columbia River the largest."

"Others say the Yukon. We know that the Columbia is five miles wide at its mouth, and a few miles farther up it widens to fifteen miles. On this wide part is situated Astoria, once a fur-trading post founded by New York's great merchant, John Jacob Astor."

"I once read somewhere," Fred said, "that while sailing over this part of the river four snow-crowned, stately mountain peaks can be seen from the steamer's deck, some of which are covered with snow from base to peak."

"The navigable part of this river," Mr. Cartmell continued, "is divided into four parts. The first part is from the mouth to the Cascades. Here the river falls about forty feet, one half of which is taken at one leap. The sides of the Cascades are high, mountainous crags, in some cases three thousand feet high. The portage here is about six miles. It is passed by a railroad, which is built near the water's edge. The traveller can see from the car windows the river, narrowed to half its usual width, dashing wildly against huge bowlders, and lost in white foam like the rapids of Niagara. (See a good map.)

"The second section is from this to the Dalles. Through most of this part the river flows as smoothly as if it were a long, peaceful lake. It is said the river goes through the Dalles edgewise, so narrow is the channel. A small boy can easily throw a stone from bank to bank. A railroad, fourteen miles long, carries freight and passengers through this mountainous section."

CASCADES OF THE COLUMBIA.

"What is the next section?"

"The third part extends from the Dalles to a point near the British line. One of the first noticeable views will be that of Mt. Hood, a beautiful peak in the Cascade range, to the south of the river, and Mt. Adams, another lofty peak, to the north of the river, both standing as grand sentinels to bar the passage through the mountain range. This third section in the great plain of the Columbia is the bed

MT. HOOD.

of a former inland lake, or sea. It is the great grass and grain growing section of this country."

"In what country is the next part of the river situated?"

"The fourth section is entirely in British America, extending from the line through the Lower and Upper

Arrow Lakes to the Boat Encampment at the Big Bend. Above this the main river is navigable only for small boats, with many interruptions from falls and rapids. The river flows in that part of the Rocky Mountain country which has recently been opened up by the Canadian and Northern Pacific railroads."

SNAKE RIVER, EASTERN IDAHO.

"Miss Gray then told them something about the two large branches of the Columbia: —

"One branch is that very crooked river, the Snake, or, as it once was appropriately called, after its discoverer, the Lewis. This branch rises in the Wind River Mountains, near Frémont's Peak, and crosses the southern side of Idaho, flowing due west. In the eastern part of this territory the Snake is crossed by the branch line of the Union Pacific railroad which runs north to the Yellowstone Park."

When their teacher had finished her description Fred asked, —

"Are you not going to tell us about the second branch?"

"The other branch of the upper Columbia is the Kootenay River, in the heart of the Rocky Mountains. The Columbia proper and this branch rise very near each other, and flow in opposite directions, forming great loops, and enclosing an oval-shaped tract of land known as the Kootenay Country, partly situated in British Columbia and partly in the United States.

"The first three hundred miles of the Kootenay is through such narrow and deep gorges that even gold-seekers cannot pass through it. Then the character of the country changes into that of a lovely valley, from four to five miles in width, between two parallel mountain ranges."

"I would like to read to the children," Miss Gray said, "a charming description of this country by a recent English traveller: —

"'There are no rapids or sand bars or sunken rocks for one hundred miles above the lake, — not a single place where the largest ship could not float as safely as our canoe, which does not draw more than three or four inches of water.

"'As we suddenly emerge from the tree-bordered river into the Kootenay Lake, a surprisingly picturesque sight meets our gaze. Before us lies a grand sheet of water, some eighty miles long and from two and a half to five miles wide, framed in on all sides by towering mountains and snow-capped peaks. This beautiful yet wild lake lies here lonely and unnoticed by the white invader, who is busy travelling to and fro on iron roads to the north

(Canadian Pacific railroad) and to the south (Northern Pacific railroad).

"'But the strangest fact I have yet to relate: Kootenay Lake never freezes over, owing to the presence of hot-springs, or in consequence of its very great depth. It is more than four hundred feet deep, and full of land-locked salmon, which cannot now get over the falls at the outlet of the lake.

"'The winters here are not as severe as in many places farther south. Cattle and horses live through the winter with very little care. This section was a few years ago the scene of a great gold excitement, when miners rushed there in large numbers, being obliged to travel over rough mountain trails for five hundred miles.'"

"Who knows any other important facts about the Columbia?"

"I understand," replied George, "it is one of the most noted places in this country for salmon. The catching of this fish on the first twenty-five miles of this river is a real business, rather than a sport, as in New Brunswick. Astoria is the centre of the industry.

"The fish begin to ascend the river from the ocean to spawn in March or April. They run up the river and all its tributaries as far as the Rocky Mountains.

"The fish are taken by gill-nets. These nets are several hundred feet long, and twelve or fifteen feet deep. The fish can be caught the best in the night. The net is cast across the stream, and with the boat is allowed to drift down the river for a mile or two before it is hauled in. Seals sometimes try to get the salmon out of the nets for food, and so are caught by the fishermen."

"Another remarkable river flows into the Pacific farther south. Can you tell me its name?"

"The Frazer," said Nellie.

"No."

"The Sacramento," said Florence.

"That is not the one I mean."

"I know," said Fred; "the Colorado."

"That is right. The Colorado River — the name means *red* — rises in the Rocky Mountains in three branches, whose sources are hundreds of miles apart. The northern branch starts near the source of the Snake River, at the foot of Frémont's Peak; the middle branch begins in Middle Parc, Colorado, at the foot of Long's Peak; and the southern branch rises in New Mexico, not far from the second oldest town in this country, Santa Fé."

"What is the general direction of the river, Florence?"

"I think it is southwest."

"Where is its mouth?"

"It empties into the Gulf of California," Nellie answered.

"You should not say 'empties.' This river never empties; it is always flowing; it always has considerable water in it.

"The country through which it flows is peculiar, — a country of plateaus and cañons and gorges; a country of rocks, — tables of rocks, terraces of rocks, cliffs of rocks, crags of rock, — with no soil or vegetation."

"In this country," Miss Gray said, "nearly every river flows in a deep gorge, or cañon, cut out of the solid rock."

"How can water cut such channels?"

"By the help of the sharp particles of sand which the water of this section carries along in its rapid course.

"The Colorado River flows in deep cuts, below the surface of the country, for about a thousand miles. One

of these cuts, or cañons, in Arizona is three hundred miles long."

"Has any one ever been through this cañon, Papa?"

"Major Powell made the dangerous journey in 1869 and in 1871.

MARBLE CAÑON.

"When the Indians learned that he intended to descend the river, they tried to prevent his doing so. One of them said, —

"'Rocks h-e-a-p, h-e-a-p high; the water go h-oo-woogh. No see 'em squaw any more; no see 'em pappoose any more.'

"But Mr. Powell and his friends were not easily discouraged. They began the journey in four boats. They

passed through Horseshoe Cañon, which describes an immense letter U in the mountains. As they went on, the cliffs increased to a thousand feet in height, and the river became more dangerous.

GRAND CAÑON.

"One day they had an exciting time. The river rolled down the cañon at a wonderful rate, and sometimes they were carried along as fast as if in a railroad train. The boats went leaping and bounding over the rocks as if really alive. Sometimes the water came into the boats from the waves, and they had to bail it out. After many narrow escapes and much hardship Major Powell and his party safely reached the outer world."

George then threw upon the screen a view of Marble Cañon, and Mr. Cartmell continued: —

"The part of the cañon below the Little Colorado is called the 'Marble' Cañon. The rocks here are of many colors, like various-colored marble. Some of the layers are white; others gray, pink, or purple. The walls are thousands of feet high. Fifty miles below, the river enters the Grand Cañon, surpassing anything of the kind in the world."

After George showed the above picture and two others equally grand and beautiful he said, —

"I have just read an account of a recent visit to the Grand Cañon, written by Rev. Mr. Cross, of Denver."

Of course, all wished to hear it. This is what George read: —

"'We bought our tickets in Denver to go by the Atlantic and Pacific railroad. This road carries one within twenty-three miles of the Grand Cañon, in the western part of Arizona Territory. The scenery along the road is magnificent.

"'We reached the Grand Cañon at six in the morning, and had four hours to stay. Time was too precious to waste in eating breakfast. Snatching a biscuit, we at once climbed a hill some fifteen hundred feet high, reaching the top in twenty-five minutes. Then we turned, and looked, and looked, and looked. For a while we could say nothing but "Oh!" "Oh!" "Oh!" Such emotions of grandeur we never before experienced. We had stood on Pike's Peak at sunrise, and looked far down on ten thousand square miles of white, billowy clouds, with here and there an opening to show us the green earth beneath; we had looked from Mt. Lincoln out upon a ragged, storm-tossed sea of snow-capped peaks and ranges, stretching far as the eye could reach, and blackened here and there by thunder-

storms; we had stood in the Royal Gorge of the Arkansas; we had looked from Crystal Peak of the Elk Mountains down into the awful gorges of Rock Creek; we had seen most of Colorado's grand scenery, — but this view eclipsed it all.

"'We looked far down on the turbid Colorado, seemingly a narrow, sluggish stream, but really a swiftly rushing torrent, the drainage of three hundred thousand square miles, and of many lofty mountain ranges, whose deep snows were fast disappearing under the summer sun. At that point the river is two hundred and fifty feet wide and over two hundred feet deep, it being then some sixty feet above low-water mark.

"'Back of us rose the Haystack, thirty-nine hundred feet high; back of that, Sunset Peak, six thousand feet high; across the river Solomon's Temple, stupendous and grand, with its majestic porches and beautiful cupola, rose six thousand feet above the water. Mt. Emma, Tower of Babel, and other cliffs were about the same height. We could look up and down the river for miles, and could see, on both sides, about twenty miles of those marble walls, stupendous in size and height, yet wondrously beautiful. And then we remembered that the cañon was *three hundred miles long*, and that in some places the rocks were eight thousand feet high, and that we had not seen the most remarkable and sublime part of it.'"

LESSON XVI.

CLIMATE.

"WELL, Florence, what kind of weather did you enjoy last week, when you were visiting your cousins?"

"It was snowing, Papa, most of the first day, and afterwards it was pleasant."

"Nellie, what was the weather yesterday?"

"Yesterday it rained nearly all day."

"To-day it has been clear and cold. These facts show that our New England weather is very changeable.

"*The average weather for a long period of time is called the* CLIMATE."

Mr. Cartmell then asked Miss Gray to tell them something about the causes affecting the climate.

"There are six important conditions which affect the climate of a country. I will name these as nearly as possible in the order of their importance: —

"1. Latitude, or distance from the equator.

"2. Elevation, or height above the sea level.

"3. Ocean currents.

"4. Amount of rain.

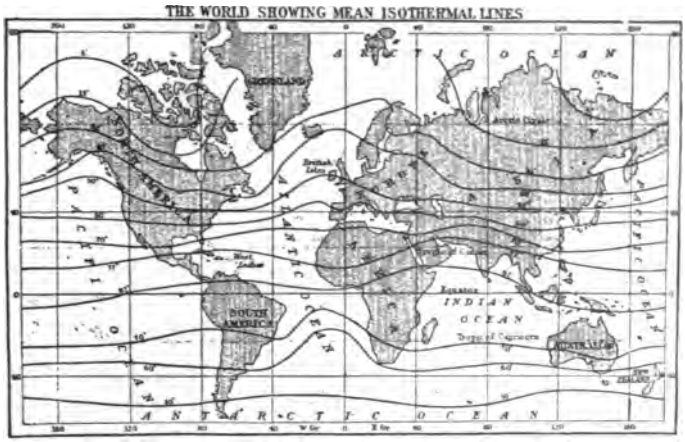
"5. Winds.

"6. Nearness to the ocean.

"Each of these causes has its own share in settling the climate of every country under the sun.

"The first and strongest cause affecting the climate of any given place is its latitude, or distance from the equator, because this determines the amount of heat supplied to that place by the sun. In a previous chapter we learned the reason of this to be owing to the angle at which the sun's rays reached the surface of the earth.

"The hottest regions of the earth — those of the highest temperature — are always found within the tropics.



As we increase our latitude, we pass into regions of lower and still lower temperature till we come to the polar regions, where the sun's rays strike the ground very obliquely at all seasons, and during part of the year do not reach it at all."

"If we draw," said Mr. Cartmell, "on a map of the world lines to show equal average temperature for the year, they are far from being straight, and they do not follow the parallels. The line of greatest heat is largely north of the equator.

"It will be seen that these lines of equal heat are least irregular in the southern hemisphere over the wide expanse of ocean. They show the greatest bendings from a straight line when crossing North America, the Atlantic, Europe, and Asia. This shows that the temperature is more uniform over and near the sea. The irregularity of these lines shows that there are other causes affecting the heat and climate besides the latitude."

"Suppose, Fred, you are living on one of the scorching plains of the tropics, and are ill from the heat, and longing for cooler air, how can you find it?"

"By leaving the lowlands and going to some place more elevated."

"Yes; the higher we go the cooler the air becomes, till at last, if we only go high enough, we find it so intensely clear and cold that it is impossible to breathe in it, while all around us we see nothing but perpetual ice and snow, although in *latitude* we may be close to the equator. Thus we see that as we increase our height above the sea, we lower our temperature in the same way as we should by increasing our latitude. By mounting a few thousand feet into the air at the equator we undergo a change of climate as great as if we had sailed away from it six thousand miles to the frozen regions of the poles.

"In South America, near Quito, which is situated on the equator, we can ascend a mountain till we cross the line of perpetual snow and ice, and come into a region too cold and desolate to live in."

"Papa, is it true that there are rivers in the ocean?" Nellie asked, with an expression of doubt in her tone.

"Yes, besides the tides, the ocean is full of great rivers, or currents, as they should be called. These cur-

rents have the effect of lowering or raising the temperature of the lands near which they flow, and hence are an important cause affecting climate.

"On the east side of the northern part of North America an icy current from the Arctic Ocean flows along the North American coast past Labrador and Newfoundland, making the air raw and foggy, closing the harbors with ice, and rendering the vegetation poor and scanty.

"The most noted of these streams is one which appears to start in the gulf of Mexico, passes round the southern point of Florida and along the eastern coast of the United States as far as Nova Scotia, then crossing the Atlantic, spreading out like a fan, continues its course between Great Britain and Iceland, along the coast of Norway, to the Arctic Ocean.

"The Gulf Stream is a large moving body of warm water, which warms our own shores, and carries heat

and moisture to the western coast of Europe, keeping those shores free from ice, and clothing the land with luxuriant vegetation. We might bathe off the coast of Norway at a place beyond the Arctic Circle, and find the water there no colder than we should in the harbor of New York.

"There is in the Pacific Ocean another current, almost as large and important, and that is the Japan Current, named after the country near which it starts. This is a warm current, and it determines the climate all along the western third of North America, making it much warmer and more moist."

"Please explain the next cause."

"Another cause affecting the climate is the moisture and dryness of the air, and the amount of rain which falls in a year. The rainfall of a country is measured in two ways, — (1) by the amount of rain which falls in a year; (2) by the number of rainy days in a year; and that country is said to have the dampest climate, not where the annual amount of rain is the greatest, but where rain falls most frequently. In tropical countries three times as much rain falls annually as in temperate countries; but, on the other hand, the further we go from the equator the greater number of rainy days we find in the year. The annual rainfall at the equator is over five times as great as that at St. Petersburg; but yet there are only about eighty rainy days in the year at the equator, while at the Russian capital there are one hundred and sixty-nine."

"How do the winds affect the climate," George asked.

Miss Gray replied, —

"The winds have a great deal to do with climate. Winds which blow from a warmer region to a cooler one,

and from the ocean to the land, are moist, rain-giving winds. Those which blow from a colder to a warmer region, are, as a rule, dry winds. Many storms in the eastern part of America come from the west. One wind which is very apt to bring rain in New England is the east wind. It brings the rain from the Atlantic, and crosses this section in a westerly direction, dropping its burden of showers as it passes.

"The great business of the winds is to *equalize the temperature* over the whole globe, and prevent those sudden and violent changes and those great extremes of heat and cold from which we should suffer if it were not for their help."

"Another cause," said George, "which has more or less effect is the *nearness to the ocean*. In summer the land is warmer than the sea; in winter the sea is warmer than the land. Hence it happens that places near the sea have more moderate and even climate than those inland; for they are cooled in summer by the neighborhood of the cooler water, and in winter are warmed by the warmer water, which has stored up the warmth of the summer, and sends it inland on moist, rain-bearing winds. This is what is called an *insular*, or island, climate."

"Can any one mention some illustrations of islands and places often visited on account of the even climate?" Mr. Cartmell asked.

"The Bermuda Islands, Bahamas, Cuba, Florida, and Old Point Comfort, in winter," replied Miss Gray.

"In summer the Isles of Shoals, Bar Harbor, Newport, Nantasket, Cape May, and a host of others," replied Mrs. Cartmell.

"I think," said Miss Gray, "one important cause affecting climate has not yet been mentioned."

"What is it?" they asked at once.

"During several winters I have visited relatives in New Hampshire. One uncle whom I visit lives in Bartlett, south of the White Mountains; the other lives in Jefferson, north of these mountains. It is always much colder at the latter place than at the former. Spring opens much earlier in Bartlett than in Jefferson. Can you not tell why?"

"Because," said Fred, "the high mountains keep off the cold winds, just as a high wall running east and west keeps off the cold, and it is always warmer on the south side of the wall than on the north side."

"When I was going to Oregon," said Mr. Cartmell, "a few years ago, I was surprised to find how much dryer the atmosphere seemed east of the Rocky Mountains than it did west of them. The mountains, like screens, intercept both cold and moisture, and greatly modify the climate. I am pleased that Miss Gray called our attention to their importance."

"The climate of North America is most easily understood by dividing the country into three belts, which we might name the Northern Belt, the Middle Belt, and the Southern Belt. As these belts correspond to the usual political divisions of Canada, United States, and Mexico and the West Indies, we will talk about the details of the climate in connection with these countries.

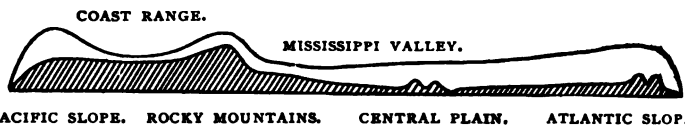
"There are a few general comparisons and observations which can be stated here as well as anywhere.

"One peculiarity of the climate in North America is the wonderful rapidity of its changes of temperature. These sudden changes are caused by the fact that the central parts of the continent are not protected from the

cold winds which blow over the immense stretch of frozen land within the Arctic Circle by any sheltering barrier of mountains. When, instead of the mild easterly wind from the Atlantic which usually prevails, the wind begins to blow from the north, the thermometer will drop from summer heat to the freezing-point in a few hours."

Miss Gray added,—

"There is a great difference in climate between the east and west coasts of North America. The east coast is noted for its fierce heat and cold; the west coast has a more moderate climate.



"If we should look at a rain map of North America, it would show us that the greatest rainfall is around the mouths of the Mississippi, and on the western coast-lands north of San Francisco. Another fact about the rainfall is illustrated by the figure given above.

"The east coast and the eastern half of the continent as far as the Mississippi Valley are plentifully watered; but on the western half of the great plains very little rain falls, and the table-land between the Rocky Mountains and the Coast Range is an almost rainless region, but the west coast is well supplied with rain.

"This arrangement of the rainfall is caused by the effect which the great western backbone of mountains has on the prevailing winds. The prevailing winds of the west coast are westerly. They come from the Pacific Ocean laden with moisture; but on meeting the lofty bar-

rier of the Sierra Nevada and the Cascade Range, which run at right angles to the direction of these winds, they are deflected — that is, *bent* — northwards into higher and colder regions, where they are chilled, and forced to drop their moisture in torrents of rain. Thus by the time they reach the thirsty table-land between the coast ranges and the 'Rockies,' they have become *dry* winds, unable to refresh the parched ground.

"There is also a strip east of the Rocky Mountains which has very little moisture, but not little enough to make it an absolute desert. Shrubs and grasses grow here sufficient to pasture many head of cattle."

"How fortunate it is," said Mr. Cartmell, "for the eastern part of the United States, that the Gulf of Mexico advances so far into the country! From the Atlantic the northeast trade-winds, which blow into the Gulf of Mexico, are turned northward by the Mexican mountains, and pass up the valley of the Mississippi, dropping rain in gradually lessening quantities as they go. The eastern slopes of the Alleghany Mountains are also watered by moist winds from the Atlantic."

LANGUAGE LESSON.

Use the following words in as long sentences as you can easily make: —

Climate, snowing, papa, weather, latitude, elevation, sea level, ocean currents, rain, winds, sun's rays, temperature, equator, foggy, rainfall, affect the climate, cooler, Bar Harbor, colder, torrents, thermometer, direction, moisture, dry, table-land.

LESSON XVII.

SOME OF OUR LAKES AND A WAY TO THEM.

"IF we were standing in New York City," said Mr. Cartmell, "at the foot of Desbrosses Street, about half-past eight some fine morning in July, we would see approach the wharf a magnificent steamer, — a real floating palace.

"'All aboard for Albany!' cries the uniformed official.

"Suppose we step aboard. Our first surprise would arise from seeing so many different kinds of ships moving about over this part of the Hudson River. Steaming among these various crafts, we hasten up the great river, having Jersey City and Hoboken on the left, and long lines of wharves and warehouses of New York on the right.

"Very soon the bold front of the Palisades is seen on the left. These rocks rise abruptly above the river from three hundred to five hundred feet. Back of the river the range slopes away very gently, and forms a fertile, smiling country. The highest part of the bluffs is opposite Sing-Sing, where they jut out into the river like a huge buttress."

Miss Gray asked the children if they had ever heard of this part of the Hudson River before.

Fred replied, "Fort Washington was on a bold cliff opposite the Palisades. It was captured in 1776."

HUDSON RIVER.

"Opposite the beautiful town of Yonkers, Hudson's 'Half-Moon' anchored after leaving New York Bay," added George.

"'Sunnyside,' the home of Irving, is plainly seen from the steamer," said Mrs. Cartmell.

"Tarrytown is on this part of the Hudson," said Florence. "Here Washington Irving is buried. Close by the church is the opening of Sleepy Hollow. In this town André was captured."

"The river now widens," continued Mr. Cartmell, "into the form of a lake, in some places four miles wide. Here the Croton River enters the Hudson on the east. This river supplies New York, forty miles away, with plenty of good water.

"Soon the steamer bears us among higher hills and into the most beautiful part of the river's course, called 'the Highlands.' Stony Point is the first place of interest on the left. What name, Fred, connected with that place?"

"Mad Anthony."

"On the right hand rises next the projecting mass of Anthony's Nose, the highest peak to be seen on the trip. What do you consider the most beautiful part of the Hudson, Miss Gray?"

"I think the centre of attraction is about West Point."

"Is not that where Cousin John is at school, Mamma?" inquired Florence.

"Yes; he is a cadet in the United States Military Academy, which is situated on this most beautiful part of the Hudson."

"Opposite West Point is Sugar Loaf Mountain," continued Mr. Cartmell, "near which lay the 'Vulture' when Arnold was obliged to escape to a place of safety. The Storm King, just beyond, is a bold mountain cliff frequently climbed by tourists for the splendid views from its summit."

"Are not the views of the Catskill, Papa, as fine as these you have just described?"

"The Catskill Mountains are too far from the river to show much of their beauties."

"When does the steamer reach Albany?"

"About six o'clock."

"The ride from Albany to Lake George," said Mr. Cartmell, "is, a part of the way, along the waters of the upper Hudson, and through the romantic country of Cooper's great novel, 'The Last of the Mohicans.'

"The usually placid Lake George lies between the Adirondacks on the west, and the Green Mountains on the east. It is a tributary of the St. Lawrence by way of Lake Champlain. It lies about three hundred feet above the latter lake."

LAKE GEORGE FROM THE SOUTH.

Miss Gray then added, —

"It is said that Lake George contains just three hundred and sixty-five islands, one for each day in the year. These vary in size from a mile in length to the diameter of a tea-table. Upon some of these islands only moss and flowers grow; upon others, large trees cover the island down to the water's edge, and their graceful outlines are reflected from the mirror-like surface.

"The water of Lake George is remarkably pure and clear; while the waters of Lake Champlain, four miles away, and the Hudson River contain more or less lime."

"How can this be possible?" asked Fred.

"Perhaps Lake George is fed by underground springs."

"What did the French call this body of water, Miss Gray?"

"'The Lake of Sacrament,' on account of the purity of the water."

"What did the Indians call it?"

"'The place where the lake closes.'"

PARADISE BAY.

"Who gave it the name 'Horicon'?"

"Cooper, in his novel, 'The Last of the Mohicans.'"

"A friend of mine," said Mr. Cartmell, "who lives near the lake, and has often crossed its smooth surface, and who greatly enjoys its surroundings, thus speaks of the natural beauty he finds there: —

"'This beautiful sheet of water is studded with forest-covered islands, one, as we are told, for every day in the year; shadowed by mountains, which sometimes recede far enough from the shore to leave space for fair fields

and pretty villages, but for the most part crowd close to its shores with bold precipices, beetling crags, and bald, ragged summits. During the long winters of this northern clime it is bound with giant bands of ice, and swept by blasts from the polar regions. But in summer-time, when the sun lies long upon its sweet waters, penetrating its clear

LAKE IN NEW HAMPSHIRE.

depths and making the white sands of its bottom shine like diamonds, its breezes are gentle,

> "'And the pale health-seeker findeth there
> The wine of life in its pleasant air.'

"'As the sailor regards the last storm as the severest he has ever known, so the visitor at any of the almost numberless hotels and cottages on the lake-shore feels for the time that no other furnishes so grand and fair a sight. At

one time the broad expanse of the lake and the extended views of distant mountains spread out before him at Fort William Henry, the Sagamore, and the Bolton hotels are the most delightful. At another the comparative seclusion, with endless variety, at the hotels and cottages of Catskill Bay charms him most. At another nothing is so captivating as the close-overhanging hills, the crowd of islands, the winding straits, and cool grottos of the Narrows and Paradise Bay. Again his soul is filled with that sense of the grand and the awe-inspiring which is akin to religion, as he sits under the lofty crags of Tongue Mountain rising behind him at French Point, looking up at the still higher summit of Black Mountain, round and bald and gray, rising just across the water, springing, as it were, into the very sky from his feet, while to the north and south extends on either hand almost the entire length of the lake. While at still another time the quiet of Sabbath Day Point or the coziness of Roger's Rock invites to rest and contemplation. The delights of Lake George can neither be exhausted nor exaggerated. Much of the way from Caldwell to Bolton is like a forest park.'"

"Are there any pretty lakes nearer home?" Florence asked.

Miss Gray replied, —

"Nearly every State in New England has many lakes of local celebrity. In New Hampshire, Lake Winipiseogee is the largest and best known. The lakes in this State are often crowded with islands, and surrounded with hills.

"But Maine has more lakes than all the rest of the New England States. The most noted are Moosehead, the Rangeleys, and Sebago."

"I have read," said Fred, "about people going to these lakes to hunt and fish."

Fred at this point wished to know if there was a great difference in the size and peculiarity of the different lakes.

His father replied by asking George to throw upon the screen the comparative map of the largest American lakes.

COMPARATIVE SIZE OF LAKES.

"These lakes are all drawn upon the same scale. Notice how small Lake Champlain is, compared with most of the others. You now see the propriety of calling Lake Superior and her sisters the 'Five Great Lakes.' But size and beauty do not always go together. Many of the most beautiful lakes in different parts of the country are too small to be drawn on the above plan.

"A short distance by rail from Lake George brings the traveller to Lake Champlain, named by its discoverer

in 1609 after himself. Does any one know by what appropriate name the Indians called it?"

Miss Gray replied, "I think they called it 'The Gate of the Country.'"

"Is there any history connected with this body of water?"

"Few places in America have more historical and romantic associations than Lake Champlain. Many of these incidents are recalled by merely mentioning such names as Crown Point, Fort Ticonderoga, and Commodore McDonough.

"The ruins of Fort 'Ti' still stand on the elevated peninsula, commanding a fine view of the upper, or southern, end of the lake, and of Mt. Defiance, two miles away towards Lake George."

"Is Lake Champlain larger than Lake George?"

"Yes, many times larger. It is one hundred and twenty-six miles long, varying in width from a part so narrow a steamer can hardly turn round in it, to the great stretch of water opposite Burlington, which must be at least ten miles wide."

Nellie wished to know how the shores appeared.

"There are mountain ranges about this lake," replied her father, "the Adirondacks on the west and the Green Mountains on the east, but these elevations do not rise abruptly from the water's edge as about Lake George, forming steep cliffs. Broad meadows and rich farm lands slope gently down to the shores of the Lake upon which happy homes are situated."

George then gave a few facts: —

"Elegant and commodious passenger-steamers ply up and down the lake, carrying, in summer, numerous tourists to the many places of interest along its shores.

"Lake Champlain drains into the St. Lawrence by the Richelieu River, which, owing to a number of falls, is not navigable by steamers. An excellent canal with locks furnishes transportation for freight around these cascades."

"Reaching the St. Lawrence," said Mr. Cartmell, "we have found the natural water way to the chain of Great Lakes, to be fully described when we speak of this river in the future.[1]

"There are many fine lakes in New York state; but one with a long Indian name has become widely known for its 'University in the Woods.' Who remembers the name?"

"Chautauqua," replied three of the children, at once.

"Thousands of people visit this lake each season. A dozen large steamers ply up and down its length of eighteen miles, with bands playing and banners flying, making summer a grand hey-day of pleasure."

"Are there many lakes in the West besides the Great Lakes?"

"Some of the western states are abundantly supplied with lakes; any good map will show what states. These lakes are used as favorite summer resorts. I once spent a day on Lake Minnetonka with friends from St. Paul. We sailed over the lake in a fine steamer and greatly enjoyed the trip."

Miss Gray then read a few selections from noted poems.

"I will read first a few lines from Miss Faugeres' poem on the Hudson:—

[1] See Lesson XIX.

"'Through many a blooming wild and woodland green
The Hudson's sleeping waters winding stray;
Now 'mongst the hills its silvery waves are seen,
Through arching willows now they steal away.'

"Stoddard once wrote a poem called 'The Gates of the Hudson,' in which are these two stanzas: —

"'God built these hills in barrier long,
And then he opened through them
These gates of granite, barred so strong
He only might undo them.

"'Through them he lets the Hudson flow
For slowly counted ages,
The while the nations fade and grow
Around the granite ledges.'

"One of the most beautiful poems about Lake George was written by Henry Morford, and begins: —

"'In the midst of the mountains, all bosky and wooded,
Its bosom thick gemmed with loveliest isles,
Its borders with vistas of Paradise studded,
Looking up to the heaven sweet Horicon smiles.

"'Thickset are its haunts with old legend and story,
That, woven by genius, still cluster and blend;
But its beauty will cling, like a halo of glory,
When legend and record with ages shall end.'

"Mr. H. T. Tuckerman has a charming poem on Lake Champlain, beginning: —

"'Not thoughtless let us enter thy domain.'"

LESSON XVIII.

THE DOMINION OF CANADA.

MR. CARTMELL began by saying: —

"The Dominion of Canada is only a little smaller than the whole continent of Europe. It is about the size of the United States without Alaska. It stretches from the Atlantic to the Pacific, a breadth of nearly four thousand miles. Its southern boundary is the United States; its northern limits reach to the Arctic Ocean.

"Across the Gulf of St. Lawrence, a thousand miles up a great river, then another thousand miles over four great lakes, and we have only reached the middle of this vast territory. A third thousand miles across rich prairies, and we have reached the Rocky Mountains. A fourth thousand miles over these mountains, and across British Columbia, and we stand on the shores of the Pacific.

"Except on the west, where the Rocky Mountains are, this vast region forms a part of the great plain which runs through the whole of North America, from north to south. It constitutes an immense extent of forest, broad fertile tracts, marsh, lake, river, and frozen plain, broken towards the Arctic regions into many islands, large and small, and pierced by inlets of the size of seas, of which Hudson Bay, named after its discoverer, is the largest."

Miss Gray then continued: —

"The Dominion of Canada may be divided into three great divisions,— the Atlantic, the Central, and the

Pacific. The Atlantic division includes the older settled provinces, from Nova Scotia to Ontario. This part contains most of the wealth and population. It is the forest section.

"The Central, or prairie, division extends from Lake Superior to the Rocky Mountains, a distance of a thousand miles. In this section is embraced the largest single tract of country in the world adapted to the growth of

Each square is one thousand miles.

CANADA.

wheat and such grains, and also especially well-fitted for cattle-raising,— on the western plateau, where cool and abundant water is combined with moderate climate.

"The Pacific division embraces the volcanic region west of the Rocky Mountains to the Pacific Ocean, and is generally known as British Columbia."

"For what is this division noted?" Fred asked.

"The climate here is favorable to agriculture wherever the land is fitted for tillage. But the great wealth is prob-

ably to be found in its extensive resources of precious minerals. Millions of dollars' worth of gold have been already taken from the Frazer River. The coalfields on Vancouver Island are inexhaustible."

"I wish, Papa, you would show us a map of the country."

"Why, Nellie?"

"Because, it helps me to remember better what you say."

"You are right, Nellie. George may now show us a map of the Dominion of Canada."

After the picture was thrown upon the screen Mr. Cartmell called their attention to the squares, showing so plainly, by the size of 1000 miles each way, the distance from place to place.

"Does any one know how long this part of America has been called the Dominion of Canada?" inquired Miss Gray.

"Ever since 1867," replied Florence.

"That is right," continued Mr. Cartmell. "Before that date we usually talked about the *Two Canadas*, by which we meant Canada East and Canada West. When I was a boy and went to school these sections were called 'Lower Canada' and 'Upper Canada.'

"As the country grew the necessity increased for union and a central government, just as it did when the republic of the United States was formed, nearly one hundred years earlier."

Miss Gray then asked the children to tell what *provinces* constituted this Dominion; and they named them in order, beginning with Nova Scotia.

"There are," said Mr. Cartmell, "seven provinces, five districts, and two territories in this Dominion. They can

be grouped in another way into the Maritime Provinces, the Two Canadas, the Central Provinces, British Columbia, and the Northern Territories."

"What province did not join?"

"Newfoundland."

Miss Gray then gave some interesting facts about the surface of the great Dominion.

"When we examine the relief of the Dominion two facts strike us. The first is that, although Eastern Canada is hilly, it is only in the far west that the country contains really lofty mountains. The second fact is that the Dominion does not possess a single separate mountain system of its own. The western mountains form part of the vast range which extends along the western regions of the whole continent, and is often spoken of as the backbone of America, while the eastern hills found on the southern side of the St. Lawrence estuary are part of a range which stretches through the United States almost as far south as the Gulf of Mexico.

"The western ranges of North America are called the Rocky Mountains. Within British Territory they extend for two thousand miles from north to south, and include two or more parallel ranges, of which the most western is about one hundred miles from the Pacific Ocean. The highest summits of the Rocky Mountains are found in the southwestern portion of the Canadian Dominion. Here, in a cluster, are the lofty peaks of Mounts Murchison, Hooker, and Brown,— the last-named being about 16,000 feet high, and all of them covered with perpetual snow. As the range approaches the Arctic Ocean it decreases very much in height, but occupies a greater width, and the intervening valleys are more extensive."

"Where is the highest peak?"

"The mountains which lie nearest to the Pacific coast form part of a chain which extends far south into the United States, and is known as the Cascade range, but attains its greatest height in the northern part of the Canadian Dominion, where it culminates in Mount St. Elias, 19,000 feet high. The Cascade Mountains and Rocky Mountains to the east of them enclose between them a

THE ROCKY MOUNTAINS AND THE UPPER PART OF THE ATHABASCA RIVER.

lofty table-land, intersected by the smaller ranges of the system and furrowed by deep valleys or gorges, clothed for the most part with magnificent forests.

"In spite of the height of the bordering chains, this picturesque region is comparatively easy of access. Wide, deep passes occur at intervals between the mountains, through which it is possible to construct roads or railways.

There are also numerous passes by which the traveller may cross either on horseback or on foot without difficulty. The Canadian Pacific Railroad crosses Kicking Horse Pass at the height of 5,300 feet. Thus the mountains of Western Canada do not, like so many others, offer impassable obstacles to internal intercourse."

LESSON XIX.

THE RIVERS OF CANADA.

GEORGE now began an interesting description of the drainage of this part of North America.

"No country surpasses Canada in the magnificence of its water-ways. The rainfall is abundant, and the climate for a large part of the year is so cool that the evaporation of the moisture is slow. In winter it is stored in the deep snows which cover nearly the whole land, and which melt so slowly on the higher mountain summits that they afford throughout the summer a continuous supply of water to many large rivers. Even some of the tributary streams are larger than several of the great rivers of Europe.

"The most important of the rivers of Canada is the *St. Lawrence*, which flows from a chain of lakes exceeding in extent and volume of water any other series of lakes in the world, and which form part of the boundary line between Canada and the United States. It has been estimated that the basin of the St. Lawrence, including the lakes which form its head-waters, contains more than half the fresh water of the globe.

"We will take an imaginary trip over the whole length of this vast water-way.

THE ST. LAWRENCE.

"Away in the heart of the American continent, through the broken, swampy land at the edge of the great prairies or meadow-plains, flows a little trickling rill. Then for some few miles it tumbles along its stony bed, sparkling at the feet of dark pine-trees, or running gayly along between tall cliffs, until it dashes with a merry leap into the bosom of a great lake. This little stream, a frisky mountain-torrent full of life and vigor, becomes ere long a mighty river, broad and deep enough to bear the largest vessels. These are the head-waters of the great *St. Lawrence*, and in this district may still be seen some of the camps of the Red Indians.

"So much are the physical features and the social life of Canada connected with the St. Lawrence that to view the country and to become acquainted with its people we cannot do better than take a voyage along the river's course. The tiny stream which gives birth to the noble river is called the St. Louis, and the lake into which it flows is the wide-spreading *Lake Superior*.

"'Are we on a lake or on the sea?' a traveller in the middle of this lake might naturally ask as he looks around. No land is to be seen on either side; and if he climbs to the top of the mast, he still sees water on all sides as far as the eye can reach. But the water is fresh, as you perceive at once if you taste it. It must, therefore, be a lake, — but how large!

"Lake Superior is the largest fresh-water lake in the whole world. Its clear waters stretch over an area nearly

as large as Ireland; for it covers about 30,000 square miles. It abounds with plentiful supplies of delicious fish, and the richest stores of iron and copper in the world are to be found around its shores."

"What do we see next, George?" Nellie inquired.

"Leaving Lake Superior, we steam along the short river *St. Mary*, and enter the broad expanse of *Lake Huron*. Away on our right, hidden amongst the thick forests that clothe the land, lies the entrance to *Lake Michigan*, a third great lake which belongs entirely to the United States.

"We soon find in crossing Lake Huron that it is almost as extensive as Lake Superior, for its shores are out of sight for a long distance. Yet we are not alone; there are many fussy little steamers crossing and recrossing from shore to shore, for we are now gradually leaving behind us the silent, lonely forest, and are nearing the busy haunts of men.

"At the southern end of Lake Huron we pass down the river Detroit into *Lake Erie*, the shallowest and most dangerous of all the Canadian lakes. As we steam slowly across the lake, we see through the clear, calm air carefully cultivated patches of ground fringing the coast, each with its log-house and farm-buildings. Here and there a small church nestles under a wooded hill-slope, or a little village of clustering houses reveals signs of patient industry. Here, too, are beautiful corn-fields, and patches of oats and barley.

"Reaching the lower end of the lake, we leave our vessel, which passes through the Welland canal into *Lake Ontario*, while we journey overland along the banks of the *Niagara River* to see the world-renowned *Niagara Falls*."

Florence then quoted the lines: —

"'Hosts of water — maddened water!
Rumbling, tumbling, sweeping, leaping,
Carnival of rivers keeping,
Breaking with resistless might
From the cloud-surrounded height.'"

BEHIND THE FALLS.

George then threw upon the screen a view behind the Falls, and continued: —

"The first view of the Falls is often disappointing to the traveller, though he can hardly tell why. But the longer he gazes at the majestic scene, the more its grandeur grows upon him. The ever-falling volume of water, the deafening roar, the whirling turmoil in the pool below, the sense of utter helplessness against such unbounded strength and power, all combine to fill him with awe.

"The waters of the river become more troubled as they hurry onwards, and a prettily wooded island called Goat Island splits the stream into two currents, each of which

dashes along in a rapid, foaming torrent, and hurls its mighty mass of water over a ledge of rock into the whirling, roaring pool below. The left branch of the divided current forms the *Horseshoe Fall*, while the right one makes the smaller, but still very imposing, *American Fall*."

Mrs. Cartmell said: —

"The celebrated novelist, Anthony Trollope, who visited the Falls some time ago, has written a very interesting account of them, in which he says: —

"'All the waters of these huge inland seas run over that breach in the rocky bottom of the stream; and thence it comes that the flow is unceasing in its grandeur, and that no eye can perceive a difference in the weight, or sound, or violence of the Fall, whether it is visited in the drought of autumn, amidst the storms of winter, or after the melting of the upper worlds of ice in the days of the early summer.'

"In summer, with the bright sun shining upon the sparkling, green water, and gleaming through the clouds of spray, the Falls present a charming sight. The famous circular rainbow is also formed by the sun's rays as they pierce the dense spray.

"But the most fascinating part of the Falls to me is the *Whirlpool*. Below the Falls the river sweeps on with terrible violence, amid rapids and eddying whirlpools, such as you see in the picture, until it gradually expends its force, and glides as a quiet stream into the broad basin of *Lake Ontario*, the most eastern of the great chain of Canadian lakes."

Miss Gray again took part in the description when George showed the next picture: —

"At the eastern end of Lake Ontario is the town of Kingston, where the St. Lawrence begins again to carve its way over stony bed and through tangled brake towards the ocean. And what a scene of lovely beauty here reveals itself! The lake of the '*Thousand Isles*,' as this wide part of the river is called, is dotted all over with rocks and green islets, which sparkle in the sunshine like gems set in a fairy sea.

WHIRLPOOL.

"Here the great river is about seven miles wide, and the whole area for many miles down is a winding maze of water, the rocky wood-clad group of islets separating the deep, strong-running channels.

"Each island is much like its neighbor, differing only in size and shape. Each is lovely in the summer season, when countless pleasure-boats and yachts dot the surface of the waters, and merry parties, escaped from the heat, turmoil, and restlessness of the large cities find breathing-space and leisure to enjoy the quiet beauty of each little paradise set in the silver current.

"Several of the rich and noted men in New York City have their summer homes on some of these islands."

Mr. Cartmell followed Miss Gray in telling about the river: —

"The rapids of the St. Lawrence between Kingston and Montreal are very picturesque and beautiful. The two most noted ones are the Long Sault and the Lachine.

THOUSAND ISLES.

"The former, which means 'the long leap' or waterfall, is nine miles in length and a perfect sea, with its waves surging and dashing in snowy crests over the upper part of the steamer.

"The Cedars is the next and the most exciting rapid until Lachine is reached. An Indian pilot is here taken on board, and some marvellous steering has to be accomplished before the big vessel has safely passed the ledges

over which the cataracts roar in angry floods, and is safe at Montreal."

"The city of Montreal," said Miss Gray, "stands on an island, and the river on the south side of this island is about two miles wide. Below this city the river gradually widens. A vast amount of shipping passes up and down.

LONG SAULT.

The banks of the river are well lighted with lighthouses, so that at night the river seems somewhat like a wide, but fairly well-lighted street.

"Forty-five miles below Montreal the St. Lawrence expands into a great lake thirty miles long and nine wide, and only twelve feet deep. To help navigation the Canadian government at great expense steam-dredged this part of the river. Thus far the banks are not very high, but as Quebec is approached the country becomes more hilly, and the banks higher and higher. Cape Diamond and

the citadel announce the near approach to this picturesque city.

"Below Quebec is the beautiful Isle of Orleans, which divides the river into two channels. The south shore is high, the north mountainous. From the upper end of the island are seen the Falls of Montmorenci, which leap in an unbroken sheet over a rocky bank about two hundred and fifty feet in height."

LACHINE RAPIDS.

After all had admired the picture of the falls Florence said:—

"Papa, you once promised to tell us about your visit to the Saguenay. Please tell us now."

"The Saguenay," said Mr. Cartmell, "is navigable for seventy miles, and for that entire distance it seems to the traveller as if he were passing through some awful chasm cut in the very walls of the mountains. The hills rise abruptly from the water and form an almost continuous wall, with only an occasional break, which reveals other mountain ranges in the distance.

"Along the upper part of the river one sees stunted evergreens and birches, except where forest fires have swept through, leaving desolate, black stretches. Lower down the trees are larger and soften the rough outlines of the mountains, sometimes finding chances to grow from little crevices in high precipices."

INDIAN PILOT.

"Are there no valleys between the hills, where other rivers flow into this one?" inquired Florence.

"It has some small tributaries," replied her father, "and in one place the mountain wall bends and forms a large bay called Ha-Ha Bay, where the shores are lower or even level.

"Half-way down the river are two immense capes, called Trinity and Eternity. Cape Trinity consists of three precipices, each five or six hundred feet high, which rise like huge steps, one above the other. On the face of these two remarkable profiles may be seen; and at the top of the first step a statue has been placed by monks, and a cross on the second. It is bare and frowning, and the

traveller is oppressed by its awful grandeur as he passes into its shadow.

"The opposite cape, Eternity, is even higher, but its slope is more gentle and is covered with trees."

"Are there any towns on the Saguenay?" asked Fred.

"Almost none," replied Mr. Cartmell. "There are a few villages on Ha-Ha Bay, and Chicontimi, at the head of steamboat navigation, carries on a large lumber trade.

FALLS OF MONTMORENCI.

"Tadousac, at the mouth of the river, was settled by the Hudson River Company, and one may visit the Jesuit chapel, built in 1746, on the spot where a still older church once stood, and which contains pictures given it by Louis XIV. The waters near here abound in fish, and the place is noted for its fine salmon."

"Is there anything more of interest?" inquired Nellie.

"The St. Lawrence," replied Miss Gray, "soon becomes thirty miles wide. Two hundred miles farther, we reach the mouth of this great river, nearly two thousand five

hundred miles from the starting-point at the head of the St. Louis river."

"Opposite the mouth of the St. Lawrence," added George, "is a remarkable island called Anticosti. Almost everything that is lost in the great river or the lakes finds its way sooner or later to the shores of this island. Many wrecks are also thrown upon it, and a person is likely to

HA-HA BAY, SAGUENAY RIVER.

see, in a morning walk, the wrecks of several vessels scattered along the shore, boats large and small, carcasses of seals and of whales, and hundreds of such small articles as spikes, buckets, spars, oars, empty barrels and bottles."

"There is another very strange fact about this island," said the teacher. "It lacks many animals found on the shores of the mainland, such as the beaver, cariboo, squirrel, and rabbit. But it has plenty of bears, foxes, otters, martens, and mice. There are several kinds of foxes, — black foxes, silver-gray, cross, and red. The skins of the black fox are worth one hundred dollars apiece."

"Who live on this island?"

"Less than one hundred people occupy this great tract of land. Most of these are connected with the various lighthouses, or engaged in fishing. A government steamer calls upon them twice a year, with provisions and news of the outer world."

LESSON XX.

TO THE FALLS OF NIAGARA.

MANY writers have described the wonders of Niagara both in verse and in prose. The following stanzas, addressed "To the Falls of Niagara," bring out in an interesting way the most striking features of this great natural wonder: —

"No fleets can stop thy progress, no armies bid thee stay,
But onward, onward, onward, thy march still holds its way;
The rising mists that veil thee as thy heralds go before,
And the music that proclaims thee is the thundering cataract's roar.

"Thy diadem 's an emerald, of the clearest, purest hue,
Set round with waves of snow-white foam and spray of feathery dew;
While tresses of the brightest pearls float o'er thine ample sheet,
And the rainbow lays its gorgeous gems in tribute at thy feet.

"Thy reign is from the ancient days, thy sceptre from on high;
Thy birth was when the distant stars first lit the glowing sky;
The sun, the moon, and all the orbs that shine upon thee now,
Beheld the wreath of glory which first bound thine infant brow.

"And from that hour to this in which I gaze upon thy stream,
From age to age, in winter's frost or summer's sultry beam,
By day, by night, without a pause, thy waves, with loud acclaim,
In ceaseless sounds have still proclaimed the Great Eternal's name.

"For whether on thy forest banks the Indian of the wood
Or, since his day, the red man's foe on his fatherland has stood;
Whoe'er has seen thine incense rise, or heard thy torrents roar,
Must have knelt before the God of all, to worship and adore."

J. S. BUCKINGHAM.

DICTATION EXERCISE.

AT THE FALLS.

"Have a care," says a recent visitor to Montmorency; "go not too near the falls side of the cone, lest you chance to slip over; if so, you would drop into the deep water at the foot of the fall and be carried under the ice, no man knows whither. Some half-dozen unfortunates have, in fact, thus slipped, and so disappeared forever."

LESSON XXI.

THE CLIMATE OF CANADA.

MISS GRAY repeated the lines beginning: —

"Oh, the long and dreary winter!
Oh, the cold and cruel winter!
Ever thicker, thicker, thicker,
Froze the ice on lake and river;
Ever deeper, deeper, deeper,
Fell the snow o'er all the landscape."

Then Mr. Cartmell remarked: —

"In a Canadian winter, lake and river are frozen, a thick mantle of snow covers the land to a depth of three or four feet, the leafless trees bend and crack under the weight of their white burden, and all nature is hushed.

"Your breath freezes and falls like hoar frost, you wrap yourself in warm furs, and do not leave any part of your body but your face uncovered, for fear of frost bites. You heap huge fires to glow and crackle in the stoves until the cold is driven out of the house. Yet the cold grows ever greater; even the very wind seems frozen after a while, and the air becomes still.

"Put on your snow-shoes and thick furs, and come out into the open air. How the keen, cold air braces up every nerve, and the very keenness of the frost seems to

give you fresh life and vigor! A sharp walk over the snow will send the blood through your veins and warm you as no fire would, for, though piercing cold, the air is dry The very dryness of the air makes the cold feel less

A SNOW-SHOE RACE.

intense than it really is; and it is much less injurious to health than the cold and damp weather of Boston, New York, or London."

"The Canadians," said George, "know better than many other people how to enjoy their long and severe winters. At the first approach of snow, in November or the first of December, they enter with heart and soul into the pleasures of sleighing. There is novelty in the

appearance of the sleighs, and in the strange costumes of their drivers. The sleighs are of every variety of shape, and are drawn by fine horses, with silver bells on the harness and gay-colored rosettes on the bridles, while their occupants are warmly clad in rich furs. The merry tinkle of the bells, and the crisp sound of the runners of the sleighs as they cut the new snow, have a very cheering effect.

"Another novelty is the appearance of snow-shoes. As it is impossible to travel over the soft snow with ordinary shoes, snow-shoes, such as the Indians wear, have to be used in making a journey.

"At Quebec the winter markets are very curious. Everything is frozen. Large pigs, killed perhaps months before, may be seen standing frozen in the butchers' shops. Frozen masses of beef, mutton, deer, fowl, cod, and haddock, and eels long and stiff like walking-sticks, abound in the stalls. Milk also is kept frozen, and is sold by the pound in masses which look like lumps of white marble."

Fred then told about some winter sports.

"One of the great amusements of visitors is to climb to the top of some elevation and to slide down on a small sled of wood called a 'toboggan.' They descend at an astonishing pace, keeping their course by steering with light touches of their hands.

"Numbers of little boys are usually in attendance, one of whom accompanies the stranger in his descent. When they reach the bottom, the force of the descent is such that the toboggan is carried hundreds of feet along the level surface of the frozen path. The boy in attendance carries it up again, and the visitor once more descends the slide."

"In spite of the cold and the snow," said Mr Cartmell, "winter is a season of great enjoyment in Canada. Travelling and visiting are then undertaken. On the lakes, iceboats mounted on iron skates sail before the wind with great speed; and when the St. Lawrence is once fairly

TOBOGGANING.

frozen over for the winter, roads are opened across it, and all sorts of conveyances pass from side to side with passengers and goods.

"At Quebec it sometimes happens at the beginning of winter that the ice on the St. Lawrence breaks up, and floats up and down the river in large floes with the ebbing and the flowing of the tide. Horses and even men are

often kept prisoners on one of these floes till the ice fastens again to the shore and allows them to land. When it is once fixed, the traffic continues for months."

"What kind of a summer do the people enjoy?" Florence asked.

A FOREST PATH IN WINTER.

"The summers in Canada," said her father, "are, like the winters, longer than in England, and are much hotter, the periods of spring and autumnal weather being very short and subject to sudden changes. The causes of the warmth of the summers are, first, that during the height of the season the sky is often very clear and cloudless, and the heat of the sun consequently great; and secondly, that the interior of the country at this time of year is swept by south winds heated in their passage over the dry central regions of the United States."

"Who can tell about the *climate* of *Manitoba?*" George asked.

"I never read about the weather in that part of the country," replied Fred.

After waiting for the other children to speak, Miss Gray said: "I have read that Manitoba has a distinctly marked summer, and an equally well-marked winter. The summer is less warm than farther south. The spring and fall seasons are short, while the winter is steady and dry, but rather severe.

"The winter season freezes the earth and the rivers, gives the farmer a rest from severe toil of summer, covers the earth with a coating of snow not more than enough to make good sleighing, and gives the opportunity for enjoying leisure. Snow-shoeing, tobogganing, skating, and curling are pursued to the full during a Manitoba winter. On a pleasant afternoon in the winter months, the jingle of the sleigh-bells from scores of handsome turnouts on the chief streets of Winnipeg bespeaks a scene of life and picturesqueness."

GEOGRAPHICAL EXERCISE.

1. *Draw from memory a map of Canada.*
2. *Make a raised map of sand or putty to represent the St. Lawrence basin.*
3. *Represent in sand or putty the Athabasca River, Niagara Falls, Thousand Isles, Long Sault, Lachine Rapids, and Ha-Hà Bay.*

LESSON XXII.

SOME INDUSTRIES.

"BRITISH AMERICA," said Mr. Cartmell, "contains to-day the largest and most valuable **forests** in the world. From the head of the Ottawa westward, the traveller can go for days, for weeks, or even for months, through the virgin forest.

"Of these **pine forests** Mr. Burritt wrote years ago:—

"'What the gold mines of Australia and California are to those countries the pine forests of Canada are to it, only more abundant and enduring in value. They are safer, steadier, and more fertile sources of prosperity than any gold mine.

"'A single ship could bring away all the gold ever mined in California. Five thousand men could have gathered it all, probably, from the diggings. But the cutting of timber in Canada employs fifty thousand men in the forest, and hundreds of the largest ships are engaged in conveying the huge cargoes to the woodless nations of the world.

"'The mills, ships, and men engaged in this great business create a vast amount of other enterprise, in the building up of towns and setting the wheels of other industries in motion.

"'In these forest regions one gets a new sense of the mission of snow on the earth. There we see its value and

LUMBERMAN'S CAMP IN WINTER.

power in the service of man. Snow is the only possible roadway to the mountain forest and the lowland wood. What would all the vast forests of Canada be worth without snow? Snow is the universal railway which Nature lays down every winter in these forest regions, from the foot of every tree in the still backwoods to every saw-mill and every stream and wharf in the country.

"'The snow of Canada is said to be equal to half a million of horse-power in the transportation of timber; that is, it would require half a million horses to get the timber from the forests to the mills without snow, if it were possible at all. In travelling through these regions one cannot help being impressed with the value of snow. The people look for and long for snow as earnestly as the people of other countries wish and wait for rain in a time of drought.'"

After reading the selection Mr. Cartmell continued: —

"The lumberman is as devoted to his calling as the sailor is to his, and leads a life as free and as daring. In the autumn of every year a whole army of stalwart men, in bands of thirty or forty, marches up the great rivers and their tributaries, and invades the woods, preparing for the winter campaign.

"The first thing to be done is to build a hut or log-house for the men during the winter. The site chosen for it is generally near a stream or a mountain lake which will afford a supply of water. The materials for the house are found in the forest. A wide opening in the roof serves at once for chimney and for window.

"The fireplace is made in the middle of the great room, and the sleeping berths or 'bunks' of the men are arranged round the walls in two tiers of rough wooden

shelves. For coverings, the men have thick Canadian blankets."

"I once read," said Fred, "that flour, pork, tea, and molasses, form the staples of their diet. They breakfast

LUMBERMEN AT WORK.

before daybreak, dine about ten or eleven, have a 'bite' at two or three, supper at six, and a 'lunch' before they go to sleep. At any hour of the day or night that a stranger happens to visit them, on goes the kettle and frying-pan, and he is treated to the best they have."

"All through the winter months," said George, "they work in the woods from sunrise to sunset. They go in bands of six or eight; and as each band strives to excel the others, a great deal of work is done. At night, after the evening meal, they sit in groups around the blazing log-fire, smoking, singing, and telling stories.

"The coming of the thaw in spring is the signal for the lumbering parties to break up. Some of the men descend at once to the saw-mills; others remain to direct the passage of the logs down the valleys and streams. At rapids, and also at abrupt turns of the river, the logs are apt to ground. Thousands of logs are sometimes piled up on their downward passage, and the lumbermen, armed with steel-pointed poles have often great difficulty in setting them free.

"On the broad rivers, twenty or thirty logs are fastened together, and form what is called a 'crib.' Then the cribs are joined and form a raft, on which sometimes a whole village of little huts is built for the lumbermen to live in. These great forests lie chiefly in the valley of the Ottawa river, and in the province of New Brunswick."

"Another kind of business," added Fred, "is **ice-cutting**.

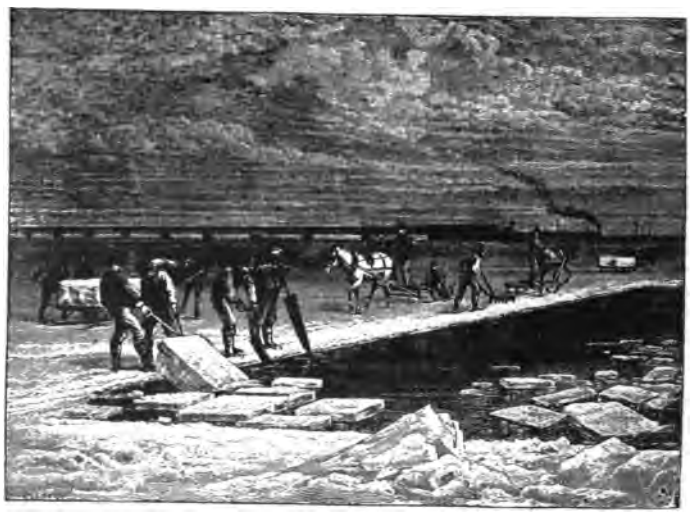
"During the winter the St. Lawrence is so well covered with strong ice that a railway is laid upon it, and a train of cars conveying passengers and goods is taken across to the opposite shore, a distance of two miles.

"The winters in Canada are always cold enough to furnish an abundant supply of thick, well-frozen ice. The harder the winter, and the greater the cold, the better is the quality of the ice.

"Men with saws and ice-cutters may be seen carving square blocks from the white floor on which they stand,

and placing them on sledges for conveyance to the store-houses."

"Can Fred tell us something about the fur-bearing animals?"



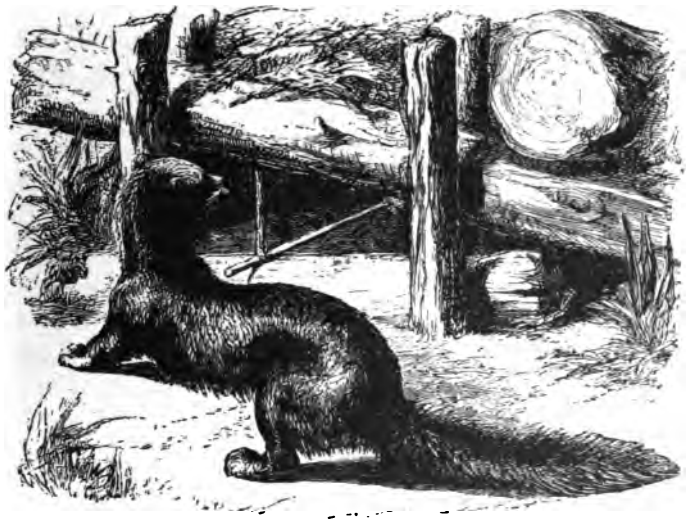
ICE-CUTTING.

"The marten and the mink are the most numerous of the more valuable fur animals found in Canada. At the beginning of November, when the animals have got their winter coats, and the fur is in good condition, the trapper prepares his pack for his trip. He generally does this in the following manner: —

"Folding his blanket double, he places in it some pemmican, or pounded meat and grease, enough for five or six days, a tin kettle and cup, a little tea and salt. The blanket is then tied at the four corners, and slung on the

back by a band across the chest. His gun, axe, knife, and fire-bag, complete his outfit.

"Tying on a pair of snow-shoes, he starts alone into the gloomy woods; for a hunter or trapper cannot whistle



A MARTEN TRAP.

or sing lest he drive away the animals for which he is searching. As he trudges along, his keen eye scans every mark upon the snow for the track he seeks.

"When he observes the footprint of marten or mink, he unslings his pack and begins to make a 'dead fall,' or wooden trap, such as you now see on the screen.

"Two logs are placed between stakes that are firmly driven into the ground. One end of the upper log is raised and supported by a short stick which rests upon another stick, holding the bait of tough dried meat.

"The top and sides of the trap are covered with bark and branches so that the only means of access to the bait is between the logs. When the bait is seized, the tree falls down upon the animal and crushes him to death.

"A smart trapper can make forty of these in a day. Steel traps are also used, as some animals are too cunning to be caught by the 'dead fall.'"

LESSON XXIII.

FUR TRADERS.

"WHAT leads men to explore new countries?" asked Mr. Cartmell.

"Love of adventure," replied Fred.

"Partly, but love of money is a greater motive.

"It was the fur trade that originally led the footsteps of the white man from the Canadian lakes and the St. Lawrence into the remote interior of the vast continent.

"The first European fur-traders were French-Canadians. To many of them Indian forest-life seemed to possess a special charm. Three or four men would join together to make an expedition into the backwoods. They would set out in their birch-bark canoe on a voyage of great danger and hardship, and lasting it might be for a year or two,—their cargo consisting of goods received on trust from a merchant.

"A voyage it might truly be called, and an exciting one; for the rivers, which cover the land like network,

and the lakes occurring in their course, were the only means by which the interior of the continent could be reached.

"In a country abounding with rapids, cataracts, and shallows, the fur-trader must have a boat made of materials at once light, flexible, tough, and capable of being easily repaired without the aid of hammer and nails, of saw and plane. This material is supplied by the bark of the paper-birch, a tree the uses of which in the Hudson Bay territory are almost as manifold as are those of the palm-tree to the inhabitants of tropical regions.

"Who can tell us about this canoe?"

"A birch-bark canoe," said George, "for trading purposes is between thirty and forty feet long. The sheets of bark are sewed together with cords made from the root of the Canadian fir. In case of a hole being knocked in it during the voyage, it can be mended with a 'patch' like an old coat, and is then almost as good as new.

"The cargo is divided into bales or bundles of from ninety to one hundred pounds' weight each. Sometimes as much as four or five tons can be carried in one of these canoes, while the canoe itself is so light that the crew can easily transport it on their shoulders. In a modern trading-canoe the crew generally consists of eight or ten men. Two of the most experienced are placed the one at the stern and the other at the bow. When the wind is fair a sail is unfurled, and serves to lighten the toil.

"The men rest for the night on shore. Immediately after they have landed, the axe is at work, and in less than ten minutes the tent is erected and the kettle is on the fire. Sheltered by their boat, which they turn against the wind, and with a flaming fire in the foreground,

they bid defiance to the weather. Very early in the morning the encampment is broken up; the boat is re-laden, and the fur-traders again embark in it, and resume their journey with light hearts. Eighteen hours of work and six of rest make up the day."

After George had finished, Miss Gray said: —

"When the traveller is obliged to force his way against a rapid, a drag-rope is used, and the canoe has to be pulled over rocks and stumps of trees, through swamps and thickets. At many places the fall is so steep that the cargo and the boat have to be carried from the lower to the upper stream. Such places are called 'portages,' from a French word meaning 'to carry.'

"There the fur-trader has to take on his back two packages, each weighing perhaps ninety pounds, and connected by a leathern belt resting on the forehead, so that his hands may be free to clear the way. Such portages sometimes occur several times in a day.

"But the travellers have not always to work up-stream. They have frequently to guide their canoe down a fast-flowing river. That is for the most part easy work. But when in their descent they come to a rapid, the work is difficult, and requires skill as well as courage.

"No use is then made of the portage, but the operation called 'shooting the rapid' has to be performed. In this everything depends on the canoe being kept in the middle of the current, with its length from bow to stern in the direction in which the stream is running.

"If the canoe is allowed to lie across the stream, all is lost. The great object of the steersman, therefore, is to keep the canoe straight. This he does with his paddle; and the process requires great nerve and skill. The

danger is great; but the excitement makes the men forgetful of the danger, and when the rapid has been successfully 'shot,' they give expression to their joy in shouts and singing."

Then Florence gave an interesting description of the beaver: —

BEAVER VILLAGE.

"The beaver is the largest gnawing animal in North America. He is still frequently found in different parts of Canada, and no more interesting creature can be studied. His body is about three feet long, and his tail nine inches. He weighs, on an average, forty pounds.

"He is a great builder, — the leading carpenter among animals. He lives, like many of the fur-bearing animals, in and about streams of water. His house is like a huge bird's-nest turned upside down. and is located in lakes or

by the edge of dams and ponds. These houses are from eight to eighteen feet in diameter.

"The entrance to the house is generally three feet below the level of the water. The chamber is rather low, about two feet in height, and has two levels. The lower level is a sloping mudbank, where the animal emerges from the water and shakes himself; the other level is higher, and contains the bed of boughs running round the back of the chamber. The couch is made comfortable by linings of dried grass and soft bark. The interior is kept perfectly clean, no refuse of food being allowed to remain about.

"When the water is not deep enough in the stream, the beavers construct a dam to hold the water back, and thus make it deeper. In many parts of the West and in Canada many of these dams can be seen. The dam is made of bushes and poles set in the mud, and the space between filled in with stones and earth. It is two feet wide at the top, and thicker below.

"If the length is not very great, it is built straight across the stream; but where the channel is broader, and the current swift, the dam curves up-stream, so as to make it stronger. The mud and stones are brought up from the bottom of the stream, and carried by the beaver under the chin in its forepaws to the place where needed. The beaver can rapidly gnaw through the trunks of trees six and even twelve inches in diameter. After the tree falls, the beaver cuts it into suitable lengths of six or ten feet, and drags them, one at a time, away to the house or dam.

"It is not true that the broad tail is used to plaster down the mud in its work, or as a carriage for materials. It is used as a help in swimming. The food of the beaver

consists of the bark of the willow, poplar, and birch, and the roots of the yellow pond-lily. They feed in the evening and during the night. At this time they work in house-building. It is, therefore, very difficult to watch them, as they are very timid and cautious. Much of what we know about their habits has been learned from the Indians."

LESSON XXIV.

CATCHING COD.

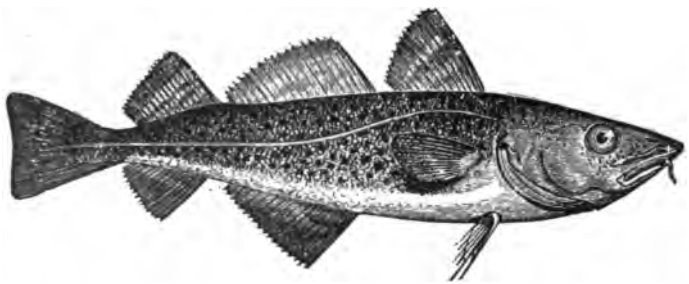
"WHERE are cod, herring, mackerel, and salmon found?" Nellie inquired.

"Your question requires a long answer, little girl, and we must divide it into parts.

"**Cod** is found on the east coast of America from the Polar regions on the north to Cape Hatteras on the south, being most abundant on the coast of Labrador and Newfoundland, and on the Great Banks, lying to the south and west. On the western coast of America cod is found from San Francisco northward, following the coast round to the Kurile Islands and Japan. In the Old World the cod has an extensive range along the coast of Norway and Iceland to the Faroe and British Islands.

"Cold-water seas are essential to the life of the commercial food-fishes, such as the cod, herring, and mackerel. The Arctic current, which washes the coasts of Labrador, Newfoundland, Canada, and part of the United States, chills the atmosphere, and bears on its bosom huge ice-

bergs. This current is the source of the vast fish wealth which has been drawn on for ages, and which promises to continue for ages to come. The great fishing interests are as much dependent on the Arctic current as the farming interests on the rain and sunshine which ripen the crops. Here is an illustration of Nature's great law of



THE COD.

compensation. While the bleak shores of these northern regions are almost uninhabitable, the surrounding seas are swarming with vast varieties of marine life."

"What food do fish eat?"

"This cold current I just spoke about brings with it the food on which these fishes thrive, and the supply is one that can never fail. This food is a 'living slime,' in some cases green in color, in some cases brown. Wherever it is found, swarms of minute creatures feed on it; and these become the food for larger animals. This slime, spread over thousands of square miles of surface, often becomes also the food for myriads of aquatic birds, and even the giant whale. The 'slime of the ocean' appears to be most abundant in the coldest water, and especially in the neighborhood of ice. Thus, then, the

great battalions of icebergs so often seen off the coast of Newfoundland carry with them the slime-food on which small creatures live; these in their turn furnish food for the herring which swarm on the Great Banks, where this food is abundant; and the herring, with other fish, are devoured by the cod."

"Schools of cod," said Miss Gray, "migrate about June from deep-water winter feeding-grounds to the nearest coast, and at the approach of winter, from the coast back to the nearest deep-water feeding-grounds. The cod caught nearer the coast are smaller and younger than those caught in deep water."

"Can George tell us about the Great Banks?"

"The submarine plains south of Newfoundland, where the finest cod are taken, are not masses of sand, but a great rocky submarine plateau, whose eastern and southern borders descend steeply to a great depth. The Great Banks are six hundred miles in length, and two hundred miles in width. The depth of water around the bank is from ten thousand to fifteen thousand feet. The depth of water over this fish plateau varies from fifty feet to three hundred feet."

"Fred, what have you learned about cod-fishing?"

"The arrival of the cod on the coast of Newfoundland about June first is heralded by the appearance of the **caplin**. This is a beautiful little fish, about seven inches in length, which arrives in vast multitudes in every bay and creek and on every fishing ground around the island. They approach the shores to spawn, and continue for about six or seven weeks, when they disappear, and retire to some deep-sea valleys of the shore, where they remain till the summer of the following year.

"As they press in on the shore in vast masses, the greedy cod follows behind, feasting on the rich banquet. In a calm moonlight night in June, when fish are plentiful and the waters alive with marine forms, the silvery sides of the cod may be seen flashing in the moonbeams. As the fish leap out of the water and dash upon the prey, the little caplin fly in all directions, and in evident terror often fling themselves on the beach."

"This little fish you call the 'caplin,'" interrupted Mr. Cartmell, "furnishes the best bait for the fishermen. Vessels engaged in fishing on the banks run into the harbor at intervals for fresh supplies of caplin, which is preserved in ice. Some idea of the immense shoals of caplin that fill the bays may be formed from the fact that a man standing on shore with a casting-net will often fill a cart with them in an hour."

"No sooner do the caplin retire," continued Fred, "from the coast than a new school appears, which also supplies food for the cod and valuable bait for the fisherman. These are the squid, or small cuttlefish. The usual time for the appearance of the squids is about the first of August. They also remain for six weeks, and are followed by the herring in the end of September and October. Without these bait-fishes the fishermen could do little in capturing the cod."

"How is the cod usually caught?"

"The cod is largely caught by the hook and line. An experienced man will, under favorable circumstances, haul up the fish, unhook them, and put on fresh bait with wonderful rapidity. When very fat, the cod does not bite readily. Seines, nets, and traps are often used. On the Grand Banks the 'troll-line' is frequently set, and fastened

to suitable moorings. They are overhauled each day, and the fish taken off."

"What do the fishermen do with the fish after they catch them?"

"When the fisherman's boat, laden with the day's catch, reaches his 'stage,' — a rough platform projecting over the water and supported on poles, — the fish are

FISH FLAKE NEAR ST. JOHN'S.

flung one by one from the boat to the floor of the stage with an instrument resembling a small pitchfork and called a 'pew.'

"The cod is here dressed, split, washed, and salted. After remaining the proper length of time in salt, it is taken from the heap, washed again, and carried to the 'flake,' where it is spread out to dry and bleach in the sun. In damp or rainy weather, or at approach of night, they are piled in small heaps with the skin outward. In due time they are thoroughly dried and ready to be assorted into the different grades."

"I suppose," said Fred, "a great part of the fish is thrown away in dressing it."

"The cod is the most useful of all fish. No part is valueless. The head is sometimes cooked and eaten. The offal and bones, when steamed, dried, and ground, are made into a fish guano of great value. From the swimming bladder isinglass is made. The roe is exported to France, and used as ground bait in the sardine fishery. The tongues and sounds are a delicate article of food. From the liver of the cod the famous cod-liver oil, a remedy in cases of consumption, is extracted."

LESSON XXV.

HERRING, MACKEREL, AND SEALS.

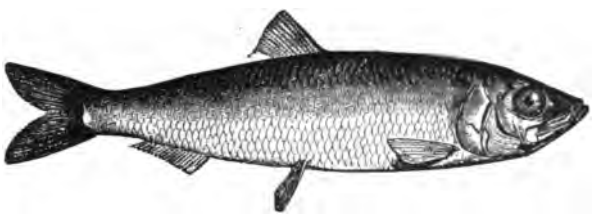
"FRED may tell us what he has learned about catching herring."

"Herring arrive in Canadian waters early in spring, soon after the ice has disappeared from the coast. Immense shoals of this fish are then seen on the Atlantic coast of Nova Scotia and in the Gulf of St. Lawrence. Herring in a shoal are frequently so crowded together as to form an almost compact mass from the surface of the water to the bottom.

"No sooner in the spring has the first shoal of herring been observed than the fishermen in the neighborhood repair to the beach with their nets, lines, and other fishing tackle. The fishermen go out in boats about the bays

and coves to spread their nets, so as to intercept the shoals of fish when seeking to approach the shore at night for the purpose of spawning. These nets are generally ninety feet long by about twenty feet wide. When the fishing is good, early in spring, each net will take from five to ten barrels of fish during one night."

"Are there any other methods used in catching this kind of fish?" Miss Gray asked.



THE HERRING.

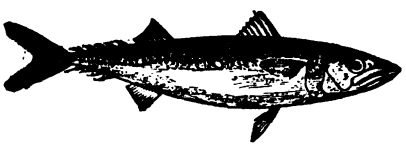
"Seines are used as a quicker method of catching herring. The seines for this purpose are over four hundred feet long, and thirty feet wide, and require eight men to manage them. The men using the seine do not wait for the fish to approach the shore, but they go out in search of them. One boat carries the large seine, and others precede and follow to look out for any sign of a shoal of fish. Sometimes they row for whole days without seeing a single fish; again they are very successful, and capture one thousand or two thousand barrels of herring in a short time.

"At such times no attempt is made to drag the seine ashore, but it is carefully fastened by braces, and the fish are removed by nets. If it begins to blow hard, the seine must be taken in at once, or the waves will tear it to pieces.

Many thousands of barrels of fish are lost by these storms. Labrador herring are considered the best."

Mr. Cartmell added to what Fred had related the following facts: —

"Herring swarm in countless millions on the gulf coast of Newfoundland and along the coast of Labrador. They are taken at various points around the island at all seasons of the year. They are a home fish, moving, like the cod, from deep to shallow water, and back again.



THE MACKEREL.

"The schools which appear in April and May are caught for bait, and sold to the French in immense quantities. The best herring are caught in winter through the ice in the bays in gill-nets, and exported to the United States in a frozen state. The largest amount of herring is taken in the fall on the Labrador coast, where they appear early in September."

George then told the others about catching **mackerel**:

"A person sailing in August through the southern part of the Gulf of St. Lawrence would see in the distance what seemed to be a squadron of yachts, with their beautiful masts and sails; but on a closer inspection these fine schooners would prove to be the mackerel fleet, carrying crews of ten to twenty men. Mackerel are caught by seine, and by hook and line.

"As soon as the schooners have reached the places where shoals of mackerel are to be found, they keep cruising backwards and forwards; and the moment there is the least appearance of fish near the vessel the jibs are taken in, and the vessel is brought to. Feed, consisting of chopped fish, is then scattered all around; the fishermen seize their lines, bait their hooks with parts of other fish, and throw them into the water."

"How does the man throw the line when fishing for mackerel?"

"Each fisherman plies two lines, one in each hand, and leans on the rail of the ship while fishing. He seldom pays out more than fifteen feet of line, as the mackerel rise to the surface to secure the chopped food thrown overboard. A crew of fifteen men will take in six hours thirty to fifty barrels of mackerel."

Fred wished to know if mackerel were not found in some other places.

His father replied: —

"Years ago large fleets of vessels from the United States resorted to the Gulf of St. Lawrence for mackerel; now these same vessels catch the mackerel with great purse-seines in the broad ocean between Cape Hatteras and Cape Sable."

"A more remarkable kind of fishing business," said Mr. Cartmell, "is the **seal fishery**. Before the cod appear the fishermen of Newfoundland sail away in early spring to the seal grounds. These are located off the coast of Labrador in the Arctic Current among the floating ice, on which the young seals are born. They grow very rapidly, and about the last of March are in good condition for the hunter.

"The experiences of a sealing voyage in this part of the world are somewhat different from what has been said about catching seals on the islands in Behring Sea. The great aim of the sealers here is to reach that portion of the ice where the young seals are most abundant. The exact position of this ice cradle is utterly uncertain. It has to be sought for amid vast ice-fields and in the midst of great danger from crashing floes and icebergs.

"When a good 'seal patch' is at last found, the vessel is 'laid to,' the men eagerly bound on the ice, and the work of destruction begins. The cry of the young seal resembles the sobbing of an infant in pain, and sometimes a young hunter is at first almost overcome by these baby cryings."

"How do they kill them?"

"A single blow on the nose from the stick stuns or kills the young seal. The skin, with the layer of fat, is taken off, weighing about forty pounds apiece. The hunter, after killing and skinning half a dozen seals, draws the pelts over the rough ice to the ship, which may be two miles away. Snatching a bowl of tea and a piece of biscuit, he hastens back to his murderous business. The skins of the young seals are worth about one dollar apiece, and the oil from the fat one hundred and forty dollars a ton. Both are sent to England. The oil is used in lighthouses, for making soap, and in oiling machinery. Half a million of seals are often caught in one season."

Miss Gray then gave some interesting facts about the **devil-fish**, or octopus: —

"The eastern shores of Newfoundland often show after a storm specimens of this gigantic fish. A number of these monsters have been captured here during the last

SEAL-FISHING OFF LABRADOR.

fifteen years. Victor Hugo, in his 'Toilers of the Sea,' gives a thrilling description of such a creature under the title of the 'devil-fish,' but the reality surpasses the fiction. His fish had arms only four or five feet long, but some of those captured in the bays around this island have been three or four times as large.

"In 1873 two fishermen were out in a small boat off the eastern end of Belle Isle, in Conception Bay. Observing something floating in the water, they rowed up to it, and one of them struck it with his boat-hook. Instantly the mass showed that it was alive. A huge beak reared itself from among the folds, and struck the boat, and a pair of large eyes glared fiercely at them. The men were petrified with fear; but before they had time to escape two corpse-like arms shot out from around the head, and flung themselves across the boat. One of the men had enough presence of mind to seize a small hatchet lying in the bottom of the boat, and with a couple of blows cut the arms off as they lay over the gunwale of the boat. The creature uttered no cry of pain, but at once moved off from the boat, and ejected an enormous quantity of inky fluid, which darkened the water for two hundred yards.

"This fragment of the longer arm measured nineteen feet in length, and nearly three and a half inches in circumference. It was of a palish-pink color, exceedingly strong and tough. The fishermen estimated that more than ten feet of this arm were left attached to the body; so its entire length must have been thirty feet. The body must have been ten feet in length. This arm is preserved in the museum at St. John's. The cuttle-fish and squids are near relations of the octopus. From the former sepia ink, used by painters, is obtained."

LESSON XXVI.

A FEW CANADIAN PROVINCES.

"YOU have told us the *names* of the **Provinces**, or States; can you not, Papa, tell us something about each one?"

"A great deal could be said, if there were time for many details. In some parts of the country the large cities are the most interesting subjects to talk about in the provinces; in another part the kinds of business are of special interest, as in the **Maritime Provinces** in the east, reference to which has been made in previous talks."

"Yes, we remember what you told us about catching fish away down east. Can you not tell something as interesting about other parts of the country?"

"I will try my best, as you are so anxious to learn; but I fear we have very few pictures to illustrate this talk."

"I shall miss the pictures," said Nellie.

"One of the most important provinces," said Mr. Cartmell, "is that of **Quebec**. It is so large it is hard to tell where the end lies. On the south and west the boundaries are plain, but to the northward and eastward the province has practically no bounds. Two thirds of its surface have never yet been surveyed. About one tenth of this vast territory is good farming land; the remainder is very rocky and barren."

"What kind of people live here?" asked Fred.

"Nearly a million Frenchmen live to-day in this part of Canada happy and contented under English rule."

"How can this be?" asked George.

"Because the French in Canada have the sense to know when they are well off. They love the country where their ancestors first settled, and in which they displayed so much heroism. They respect the nation which, after conquering them, received them on a footing of perfect equality."

"What church do most of these people attend?" Florence inquired.

"They go, like their ancestors, to the Catholic church."

"What is one of the best farming provinces?"

"I suppose **Ontario** and **Manitoba** would make rival claims to that distinction. Ontario is situated between the lakes and the Ottawa River. It contains along the lakes an extended coast-line, and nearly everywhere a rich soil, very level, and well adapted for wheat and fruit growing, also for stock-raising. Ontario was settled by people from England, and it is mostly Protestant in religion."

"What is the next province?" inquired Fred.

"Going farther west, the next province has the very musical Indian name of *Manitoba*. Look on the map of North America, and notice its situation."

"It is almost exactly in the *centre* of the country!" exclaimed the children together.

"Manitoba is only a small part of the whole section commonly known as the *Great Northwest*. It is bounded by the Rocky Mountains, Arctic Sea, Hudson Bay, and Lake Superior, and is easily divided into the northern and southern parts Through the former flows the great

Mackenzie River. All north of the Great Slave Lake is of little value on account of the cold. The southern part, especially the portion sloping towards the east, is rich and fertile, and capable of supporting an immense population.

"Throughout a large part of this region prairie and forest are found. The northern line of wheat runs from Minnesota in the United States to the valley of the Peace River in parallel 60° north, owing to the effect of the warm currents on the Pacific coast.

A VIEW ON THE PEACE RIVER.

"Besides the great river of the North there are several noble streams farther south, which have rarely been named by geographical students, but which drain great sections of fertile land. Each of the Saskatchewan River branches is eight hundred miles long, and when united they have a course of some nine hundred miles to run before they reach Lake Winnipeg."

"How can a person travel there?"

"Steamers sail from the city of Winnipeg during the six warm months thousands of miles through this beautiful country, carrying settlers and needed supplies, and bringing back grain and wild game."

"What vegetation abounds in the Northwest Territory?" asked George of his father.

"Around Lake Manitoba there is plenty of timber in the forests, which stretch in a wide arch to the forks of the Saskatchewan, and then northward until the pine and fir belts descend again near Edmonton to fill the valleys of the Rocky Mountains.

"Farther south lie the rich and enormous wheat-fields, stretching from horizon to horizon."

LESSON XXVII.

THE GREAT NORTHWEST, AND FARTHER WEST.

"HAS any one ever travelled through the Great Northwest?" inquired Nellie.

"The first European," replied her father, "who ever crossed North America from ocean to ocean was Alexander Mackenzie, a native of Scotland and the most celebrated of all the pioneers of commerce in the Great Northwest. In the year 1789 Mackenzie, after spending months in exploring lakes and woods, plains and mountains, at last reached the mouth of the great river which bears his name."

"Please tell us about his journey."

"On this journey, taken in small canoes during the summer months, he passed down many rapids, sometimes finding three in nine miles. He saw plenty of wild fowl on the river, but found few fish in its waters. The banks of the river were lined for a large part of the way with forests of birch, pine, poplar, and willow.

"On May 9 Great Slave Lake was entirely covered with ice, and he was obliged to wait some days for it to break up and disappear before he could cross the lake. In the middle of May, while encamped on an island in this lake, he could see to read at half-past eleven at night without artificial light."

"How could he read at that time?"

"Because he was so far north that the twilight was very long."

"Did anything grow here?"

"The land on each side of the river seemed to be rich, producing grass and great quantities of cranberries, gooseberries, raspberries, and other kinds of berries, which form food for many varieties of wild animals."

"How did the river look here?"

"The great river, Mackenzie reports, is ten miles wide where it leaves Great Slave Lake; but it grows narrower as it advances, and before long it becomes only half a mile wide. This narrowness is owing to its passing through a mountainous region. The river has many channels, and contains numerous islands. The ground on the upper course of the river does not thaw over five inches in depth in the short summer, yet small spruce-trees grow there. Near the mouth the trees in most places disappear, and 'tufts of moss,' with a few hardy berries, constitute the principal vegetation."

"Did Mackenzie see any game or people?"

"Bears and deer are abundant. Indians, poor and shiftless, live on the banks, and quarrel with one another, or unite to fight the much-feared Eskimos farther north.

"There has probably been little change," Mr. Cartmell continued, "in the appearance of the river from that day to this. Mackenzie has given his name to the part of the river between its mouth and Great Slave Lake, a distance of nine hundred miles. A glance at the map will show that the name should have been extended to one of the two branches flowing into Athabasca Lake, — either to Athabasca River or Peace River, which is a mile wide where it enters this lake. The Mackenzie River then would have risen on the west side of the Rocky Mountains, and had a length of nearly twenty-five hundred miles, with a basin containing almost half a million square miles, making it nearly as large as the Missouri River."

"Did Mackenzie discover any other rivers?"

"After he had explored the Mackenzie River basin, Mackenzie crossed the Rocky Mountains, and followed the Fraser River almost to its mouth, near Vancouver Island, on the Pacific. Here on a rock facing the Georgian Gulf he painted in vermilion the following inscription: —

A. MACKENZIE.

Arrived from Canada by land, 22nd July, 1792.

The words were soon effaced by wind and weather, but the fame of the intrepid explorer will last as long as the English language is spoken in America."

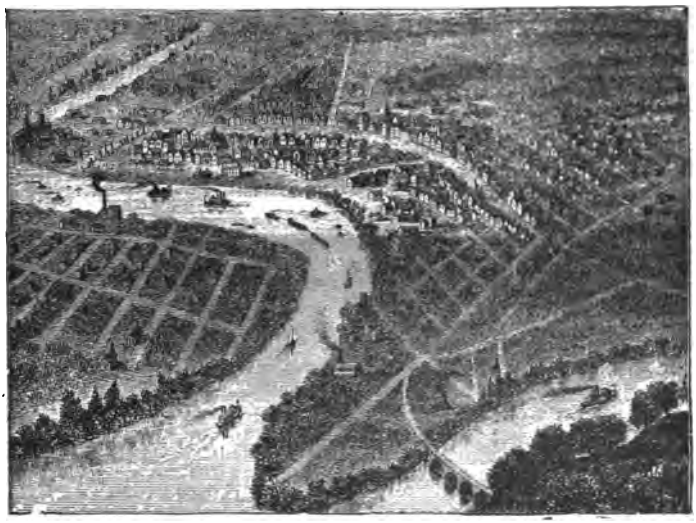
"Papa, what is the largest city in this part of Canada?" inquired Florence.

"It is Winnipeg, the capital of Manitoba and the metropolis of the Northwest."

"Have you ever been there?"

"Yes."

"Please tell us about it."



WINNIPEG.

"This place was incorporated in 1873. It then numbered about two thousand people. It has grown with wonderful rapidity till to-day it numbers forty thousand.

"The city lies on a perfect level plain at the junction of the Red and Assinaboine Rivers. The streets are not laid out with the usual regularity of Western cities. From north to south two long streets serve as arteries, — Main and Princess, — with numerous short streets parallel to

them. Main street is one hundred and thirty-two feet wide, and contains many fine brick buildings, having good fronts, comparing favorably with Chicago or Toronto. The city buildings are commodious, and faced with stone, though built of brick."

"Why do you call Winnipeg a metropolis?"

"Because it is the distributing point for districts a thousand or more miles west, four hundred miles north, and two hundred and fifty miles east. Steamers run from its piers southward past villages and towns on Red River to the United States, northward to the Lake Winnipeg lumber districts, and to connect at the mouth of the Saskatchewan with steamers which run a thousand miles up that mighty stream. The Canadian Pacific railroad connects this city with two great oceans, and the Great Northern railroad links it to St. Paul and the whole of the United States.

"Winnipeg shows an immense amount of push and energy. Her business men are very different from those of Halifax or Quebec. They are rapid, enterprising, and confident.

"Education is properly looked after. The University of Manitoba, located at Winnipeg, is under the patronage of the government. The public schools are well graded, and under the charge of an inspector, who is a local superindendent."

"Is there a province west of the Rocky Mountains?"

"British Columbia lies entirely west of the Rocky Mountains. It is bounded south by the United States, and west by the Pacific Ocean. During the last few years it has grown wonderfully. The first impulse to this growth began when gold was discovered on the Frazer River."

"What kind of a country is it?"

"It is a land of mountains, rivers, and lakes. The mountains are covered with magnificent forests, and the rivers and lakes abound with fish.

VIEW OF THE ROCKY MOUNTAINS, BRITISH COLUMBIA.

"British Columbia is by far the most beautiful of the Canadian Provinces. The mountains, valuable as they are for minerals and wood, prevent the agricultural area from being large."

"What noted river in British Columbia?"

"The Frazer."

"This river, justly celebrated for its scenery, is also noted for something else."

"I know what you mean," said Florence. "It is the greatest salmon river in the world. At certain seasons of the year the fish pass up the stream by millions."

"I have heard," Fred added, "there are so many in the water that a person can walk ashore on their backs. Do you believe that, Papa?"

"I have been told by a person who travelled there that it was sometimes done; but it seems to me like a good fish story."

George wished to know what kind of climate the people of this province enjoyed.

Miss Gray explained that west of the Rocky Mountains the shores of the province of British Columbia are washed by a warm southeasterly current; so that the climate is temperate, being very much like that of the south of England.

LESSON XXVIII.

CHARACTERISTIC CITIES.

"WHAT is the most peculiar city, Papa, in Canada?"

This question was asked one evening by Florence.

"I should say without hesitation **Quebec**. It is also one of the oldest.

"A small river called the St. Charles, winding through rich, low grounds, joins the St. Lawrence at Quebec. In the angle it makes with the St. Lawrence is a lofty promontory, and on this promontory stands the city of Quebec, walled and fortified all round. The highest point of the promontory and the most advanced into the stream is Cape Diamond, the Gibraltar of America."

George then threw upon the screen the fine picture of Quebec seen on the opposite page.

QUEBEC.

"There is not in the world," continued Mr. Cartmell, "a nobler outlook than that from the Citadel at Quebec. You stand upon a rock overhanging city and river, and look down upon the guard-ships' masts. Acre upon acre of timber comes floating down the stream above the city, the Canadian songs just reaching you upon the heights; and beneath you are fleets of great ships, — English, German, French, and Dutch, — embarking the timber from the floating docks.

"Here, farther from the sea than is any city in Europe west of Moscow, we have a seaport town, with gun-boats and men-of-war, morning and evening guns, and bars of 'God save the Queen' to mark the opening and the closing of the port.

"From the flag-staff of the Citadel, — a spot to which every newly arrived stranger naturally turns his steps, — a magnificent panorama presents itself to his eyes. The old city nestles close under the guns of the Citadel, as if for protection. A dozen steamers lie at the wharf, close under the ramparts, and the sight-seer can look down upon the decks of forty or fifty ships lying at anchor in the stream."

"What do you see, Papa, if you look far away?"

"Up and down the river, what glorious views! What an expanse of blue water and glorious sky! What masses of rock and forest, with the rugged and sharply defined mountains in the background, rising apparently sheer out of the water!"

"What else do you see?"

"Below the Citadel, but still one hundred and eighty-two feet above the river, is seen Dufferin Terrace, situated on the riverward edge of the Upper Town. This terrace

makes a noted promenade, which is crowded with people on a pleasant afternoon or a summer evening.

"Leaving the terrace, we enter what is called the Upper Town, and at once we feel as if we were in some old town in France. In the narrow streets and markets of Quebec are seen curious old gates, cranky steps that lead up to lofty-gabled houses with sharp French roofs of burnished tin, altars decked with flowers, statues of the Virgin, blouses, and the scarlet of the British soldiers."

WOLFE'S COVE, QUEBEC.

"What is this city frequently called?" Miss Gray asked Fred.

"'The Gibraltar of America,' because it is so strongly fortified."

"Who found this to be true?"

"Arnold and Wolfe."

"The latter showed what pluck can do. Seeing there was no chance to take the town in the usual way of attack, he drifted up the river on the tide, and landed in a little cove, now called by his name.

"The rest of the story you know too well for me to repeat it here. The 'Plains of Abraham' are situated west of the Citadel, and outside of the walls; they are up the river, and over Wolfe's Cove.

"On the edge of this plain, near the city, stands a tall column, decked with trophies, and rising from a square base. On it is the simple inscription, 'Here died Wolfe victorious, Sept. 13, 1759.'"

"I thought," said George, "that Montcalm's name was also on this monument."

WOLFE'S MONUMENT.

"The monument which bears both names stands in the Governor's Garden, in the city, and is less in height."

"There is about this old city," added Mr. Cartmell, "something of Dutch sleepiness and content. There is, indeed, some bustle in the market-place, where grand old dames in snowy caps sit selling plums and pears; there is much singing over the lading of timber-ships; there are rafts in hundreds floating down the river; old French carts creaking and wheezing on their lumbering way to town, with much clacking of whips and clappering of wooden shoes. The people ride out for pleasure, not in a four-wheeled buggy, but in a two-wheeled carriage called a 'caloche'; in these they move with moderate speed. But the life is sleepy, and totally unlike the stirring bustle and activity of such cities as Montreal and Toronto.

"The Lower Town of Quebec is built upon a narrow strip of land saved from the water under the lofty cliffs of the promontory. Busy wharves, with numerous ships alongside, extend all round the town and for three miles up the St. Lawrence.

"From Quebec to the opposite shore the St. Lawrence is but three quarters of a mile wide; but a basin just below is five times as wide, and large and deep enough to

CALOCHE, USED IN CANADA.

hold the English navy. Through the strait the tides flow with great rapidity, rising and falling twenty feet as the flood or ebb of the sea draws up or draws away the waters of the stream. Though so far from the sea, the influence of the tides is felt, not only at Quebec, but for hundreds of miles farther up the great river.

"Above Quebec, the shores of the St. Lawrence for one hundred miles are dotted with the white cottages of the simple French natives. It is at this part of the river that one often meets one of the great sights of Canada, — vast floating rafts of timber on their way to Quebec. These rafts are sometimes several acres in extent, bound

together by clamps of wood into a solid stage, on which wooden houses are erected as dwellings for the raftsmen during their voyage down the river. These floating islands are guided by long oars. In many cases the timber comes from a distance of hundreds of miles in the interior."

"What is the most important city in Canada?"

MONTREAL.

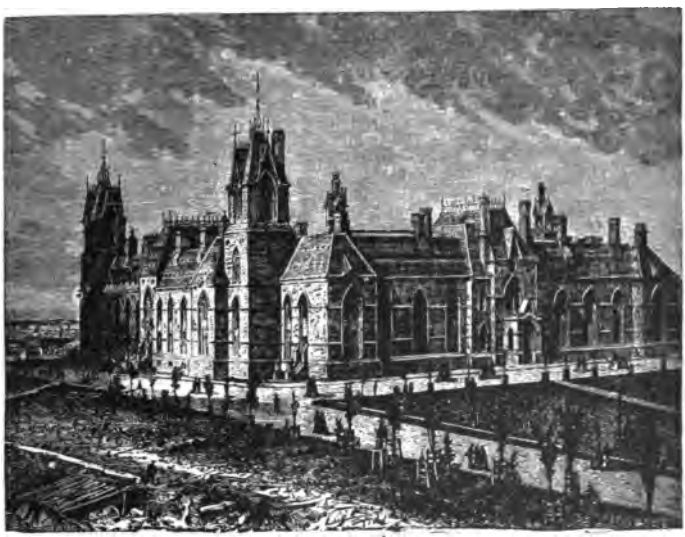
"The metropolis, or commercial capital, is **Montreal**, sometimes called the Queen of the St. Lawrence.

"The city of Montreal is one hundred and fifty miles distant from Quebec. It is built on the southern shore of an island thirty miles long. Mount Royal, from which the island is named, adds greatly to the picturesque beauty of the city, and forms its chief feature.

"Although Montreal is five hundred and ninety miles from the ocean, its commerce is enormous. Ships of the largest size, from all parts of the world, may be seen at its wharves, which extend for miles along the St. Lawrence."

"How large is this city?"

"The population, about one hundred and forty-one thousand, is a mixed one, consisting chiefly of French Canadians, but also of English, Scotch, and Irish. The Cathedral of Notre Dame in Montreal is said to be one of the largest buildings of the kind in North America. It is capable of holding ten thousand people.



PARLIAMENT HOUSE, OTTAWA.

"At Montreal the St. Lawrence is crossed by the Victoria Bridge, — one of the great wonders of modern engineering. It is constructed after the plan of the Britannia Bridge, over Menai Strait, England, and far exceeds in size any earlier bridge of the same kind. It is thrown across the river, which here is nearly two miles wide, at a height of one hundred feet above it. This great

work was completed in 1859, and it has ever since formed ne of the chief links between Canada and the Atlantic seaboard."

"What is the capital of Canada?" asked Nellie.

"**Ottawa** is on the western side of the river, in Ontario, and has grown to its present size and importance because selected, in 1867, to become the future *capital* of the Dominion of Canada.

"The government buildings are beautiful, and beautifully situated, rearing their stately heads above the river from the summit of a rocky bank.

"There are no terraces, no statues or ornaments, on the riverside, where nature is so grand that these would be quite out of place.

"The view from the library of the House of Commons is magnificent, — on one hand the Ottawa River, foaming through countless little wooded islands, and dashing itself over the falls; on the other a fine reach of the river presents itself to the eye. All around, as far as the eye can reach, is the great forest in its glory of color and form."

ST. LAWRENCE RIVER.

Down, down we glide, these "Thousand Isles" between,
  Lovely as fairyland to dreaming child,
Sweeping past shores, now fringed with verdure green,
  Now clasped by rocks and tangled forests wild;
Anon, like arrow from an aim that 's true,
  We dart adown the rapids' fearful whirl,
The rough "Cascades," the less exciting "Sue,"
  Where round the rocks the foaming waters curl, —
    And so the day glides on.

LESSON XXIX.

NEWFOUNDLAND.

Part I.

MAY-DAY had come and gone. The Travelling Club had been interrupted in its meetings by various causes. Nellie had been too sick one week to attend; George had been away on a short visit; Mr. Cartmell had extra work on the farm. The middle of May, however, brought them together once more.

"We will study to-night," began Mr. Cartmell, "a part of Canada which does not belong to the Dominion. Who can tell me to what part I refer?"

"I think you mean **Newfoundland**," said Fred.

"Look on this large map,[1] and you will see that right in the track of vessels bound from England to Canada lies a large island, nearly closing in the entrance to the great *Gulf of St. Lawrence.* It is difficult to imagine a more favorable position than that of this great island, anchored off the American continent and reaching out its farthest point towards the eastern hemisphere, thus forming, as it were, a stepping-stone between the Old World and the New. It is about the size of Ireland. Among the islands of the world, it ranks tenth in regard to size.

"As the steamer nears the American shores, you become conscious of a change in the air, a chilly wind

[1] See page 141.

sweeps round the vessel, and perhaps you are called on deck to see some grand iceberg glide slowly by. You are fortunate, too, if a thick, wet fog does not surround the ship, and render progress very slow indeed.

"The first view of Newfoundland is very disappointing. Bleak, barren cliffs face the sea on all sides; and slopes of naked rock, with no soft green pastures to relieve the eye, rise up into rugged, dreary heights that defy the climber.

HARBOR AND VILLAGE, NEWFOUNDLAND.

"Should the traveller, leaving the coast, sail up one of the fiords, he will soon find himself amid scenes of rare beauty. The shores of the bay are dotted with dark green forests. Verdant islands stud the harbor. Busy boats dance here and there on the bright waters. If it is summer, the sky will be blue and serene as that of Italy.

"Much of the island has not yet been fully explored. The centre appears to consist of high, rocky hills, which gradually slope away in all directions to the sea.

"Hills and valleys continually succeed each other, the former never rising into mountains, — the highest not exceeding fifteen hundred feet, — and the latter rarely

expanding into plains. The 'barrens' of Newfoundland are those districts which occupy the summits of the hills and ridges. They are covered with a thin vegetation. Lakes, marshes, and rivers abound everywhere, and the soil is poor and barren.

"Of course, with a severe climate and a barren soil agriculture is well-nigh impossible. The few inhabitants of the island gain their livelihood by fishing. When the fishing season sets in, great numbers of vessels from Canada, from Nova Scotia, from the United States, and even from Great Britain and France, hasten to the shores of Newfoundland to share in the rich finny harvest. Then the bays and gulfs, which before were lonely and desolate, become thickly peopled, and for several months present a very busy sight.

"The chief fishing-ground is towards the southeast, on what is called the great *Bank of Newfoundland*, a huge sandbank nearly three hundred miles in length. Hundreds of vessels assemble in these waters to catch the *cod* which come here in millions. These fish are caught by strong lines and hooks, baited with herrings or mackerel; and sometimes a single fisherman will catch as many as three hundred in a day.

"Seals, too, are often found on floating blocks of ice, and are caught for their valuable skins. Arctic animals are numerous inland, but they are not often disturbed by the hunter.

"Newfoundland, with Labrador, is the only colony of British North America that has not yet joined the Dominion of Canada, so that its government is distinct."

"Are there many rivers in this island?"

"The rivers of Newfoundland," replied Miss Gray, "are numerous, but small for the size of the country. The people do not miss the rivers when they have so many bays which penetrate the interior in all directions. Some of the rivers are very picturesque, like Rocky River, not far from St. John's."

SCENE ON ROCKY RIVER.

"What is the 'French Shore'?" Florence inquired of her teacher.

"The western shore of Newfoundland is called the 'French Shore,' because the French have the right, with the English, to use this coast for the purpose of drying and curing fish. Neither they nor the Newfoundlanders are allowed to erect their dwelling-houses, except as they may

be used for fish-curing operations. There has been within a year considerable talk in the papers about these French rights."

BETT'S COVE, BAY OF NOTRE DAME.

"What is there interesting about the eastern shore, Miss Gray?"

"On the eastern coast of the island is the magnificent Bay of Notre Dame. It is more than fifty miles wide at its mouth, and with its numerous arms reaches inland

seventy or eighty miles. Its shores are now famous as the great copper-bearing regions. The most productive mine yet discovered is at Bett's Cove, one of the small arms of the large bay."

"Is the climate there like ours in New England, Papa?"

"No; it is very different. The Arctic current, rushing out of Davis's Strait, washes the eastern shores of Newfoundland, and in spring bears on its bosom those ice-fields and icebergs which obstruct navigators crossing the Atlantic. This current has a chilling effect on the climate of the eastern coast, and frequently retards the advent of spring.

"Meeting in its southerly course the warm waters of the Gulf Stream, the Arctic current mixes with the heated 'river of the ocean,' and thus enormous masses of vapor are produced. This is the cause of the fogs which in summer frequently overhang the banks where this 'meeting of the waters' occurs. When southerly or south-easterly winds blow, the fog is rolled in on the shores of the island, covering the bays, creeks, and headlands with a thick curtain of vapor. The fog seldom goes far inland; hence the saying of the fishermen that 'the land eats up the fog.'

"While the coasts are shrouded in vapor, the sun is shining brightly inland, and the atmosphere is dry and balmy. The fogs prevail only during a part of the year. On the western shore fogs are almost unknown.

"The fierce summer heats of Canada and the United States and the intense cold of their winters are unknown in Newfoundland. It is but rarely, and then for only a few hours, that the thermometer sinks below zero in winter,

while the summer temperature, for the most part, does not rise above seventy."

"What influence does the Arctic current have?"

"The Arctic current exerts an unfavorable influence along the eastern coast; but as a compensation it brings with it the enormous wealth of cod and seals which has rendered the fisheries the most productive in the world. Only in cold water are cod and seals at home and abundant. The Gulf Stream, which creates the fog, modifies the cold; and if it darkens the skies, it paints the cheeks of the people with the rosy hues of health.

"A curious feature of the weather, called in Newfoundland 'the silver thaw,' is often seen in winter, and sometimes the same is witnessed in New England. When rain falls with a low state of the thermometer near the earth, it is frozen as it descends, and thus a regular spreading of ice takes place on the branches and the smallest twigs of trees and shrubs. The layer of ice goes on increasing till it attains a thickness of half an inch or more.

"By this a wonderful change is wrought. The trees are hung with glittering jewels, even the smallest twigs being loaded, and the branches bent to the earth. When the sun shines, a scene of dream-like splendor is presented. Each tree has the appearance of a great chandelier of crystal, the play of the sunbeams on myriads of prisms producing a dazzling effect. The weight of the icy jewelry often breaks the thickest branches."

LESSON XXX.

NEWFOUNDLAND.

Part II.

MRS. CARTMELL said that she had read lately some very interesting facts about the **people** who live in this island. The children were very eager to hear what Mamma had to say, which was that—

"The **people** of *Newfoundland* are strong, healthy, and industrious. They are law-abiding, and serious crime is very rare among them. Their kindness and hospitality to strangers who visit the country are proverbial. Kindness to the poor and unfortunate is a marked feature in the character of the people. When business is poor they are ready to share their last morsel with those in distress.

"The *fishermen* are the working classes of the country. During the height of the fishery season, and when fish are abundant, their labors are severe; but during winter they are for the most part in a condition of enforced idleness. Much of the work of curing the fish is done by women and girls, and their labors are often very heavy. When the fisheries are over, there are boats, nets, etc., to repair, stages and flakes to look after, and fuel to be cut in the woods and hauled over the snow.

"If the fishery has been successful, then the fisherman has a balance coming to him after paying for his summer supplies, and is enabled to lay in a stock of provisions

for the winter. Should the fisheries prove a failure, the poor fisherman, after all his toils, has perhaps only a few quintals of fish to hand over in payment of his advances.

"Winter is the season for enjoyment among the fishermen. This season for fireside enjoyments, home-born pleasures, is welcome. They have their simple social

ST. JOHN'S ENTRANCE.

pleasures of various kinds. Dancing is a favorite winter amusement among the fishermen and their families. Weddings are celebrated with great festivity."

"What is the capital, Florence?"

"St. John's."

"All travellers who visit St. John's," said Mr. Cartmell, "admire the striking and picturesque approach to the harbor, and the fine view on entering its waters. As the vessel glides through the narrow opening in the rocky wall, hills are seen rising on each side, some six hundred

feet high, composed of dark-red sandstone. One is called *Signal Hill*, on which stands the 'Block House' for signalling vessels as they approach the harbor. The Narrows, leading to the harbor, is about half a mile in length. At the end of this channel the harbor turns suddenly to the west, thus shutting out the swell from the ocean. In ten minutes after leaving the Atlantic, a steamer is safely moored at the wharf in the still waters of a perfectly land-locked harbor.

ST. JOHN'S, NEWFOUNDLAND.

"The city of St. John's is built on the northern side of the harbor, on a site which could scarcely be surpassed. From the water's edge the ground rises with a slope till the summit is reached, where there is a level space. Along the face of this slope the main streets run. Three principal streets run parallel with the harbor and with one another the whole length of the city. Water Street is the principal business street. Here the buildings are mostly constructed of stone and brick, but two thirds of the houses are built of wood.

"From the waters of the harbor, the city presents a very picturesque appearance climbing the slope of the hill, which is crowned by the Roman Catholic cathedral.

"St. John's now enjoys the advantage of having an abundant supply of the purest water. This water comes from Windsor Lake, four and a half miles distant from the city, and standing at a height above it of five hundred feet. The pressure is thus so great that water from the hydrants can be thrown over the highest buildings. The water is soft, pure, and excellent for all household purposes. The supply is unlimited. The city has more than forty street fountains, which are constantly in operation."

George gave a good account of the sporting in the island: —

"Newfoundland is often regarded as the very paradise of sportsmen. Its countless lakes and ponds abound with trout of the finest description, and these bodies of water are the abodes of the wild goose, the wild duck, and other fresh-water fowl. The willow grouse, or ptarmigan, the curlew, the plover, the snipe are found in the proper season all over the island. The noble caribou, or reindeer, traverse the island still from north to south, and furnish the highest prizes for the sportsman.

"Ptarmigan-shooting begins by law on the first of September. To a sportsman there can be nothing more enjoyable than a day's ptarmigan-shooting over the breezy 'barrens' in fine autumn weather. The air is then cool and bracing; the flies and mosquitoes no longer molest; the scenery is varied and charming. The 'barrens,' or open spaces clear of wood, where the game is to be sought, are clad in the sober brown of autumn, and the scent of the wild flowers is delicious.

"In summer the plumage of the ptarmigan is brownish ash-gray, mottled and barred with dusky spots. This color when the frosts set in gradually disappears, as in the common hare, and at length when the snow falls it is almost pure white. In September, after feeding on the wild berries, they are in excellent condition. A brace of them will then weigh three and a half pounds. As a table bird, they are unsurpassed in richness and delicacy of flavor.

"In addition to the ptarmigan, the sportsman meets with the wild goose, which breeds in the most secluded ponds, and brings its young down the brooks at the latter end of June. The black duck is also found in fresh water during summer. It is abundant in some places, but difficult to approach. Of all table birds, the black duck is considered the finest."

Fred then desired a chance to tell what he had learned about larger game, — a privilege which was readily granted.

"The largest wild animal on the island is the caribou, specimens of which are found at times to weigh over six hundred pounds. The winter months are passed by these animals in the south of the island, where 'browse' is plentiful, and the snow is not too deep. In March the reindeer turn their faces towards the northwest, remaining in the solitudes of the north interior till October.

"The caribou is larger and more clumsy than the common deer; the legs are shorter and stouter, the eyes smaller, and the ears shorter. The skin is brown in summer and white in winter. The fur is very thick and soft. The antlers of the caribou stag sweep backwards, and are very large in size, the brow antlers meeting over the nose like a pair of hands clasped in prayer.

CARIBOU.

"The caribou is well provided to escape from the too near approach of enemies. His short, strong legs carry him over ground such as no horse could traverse, and his broad foot prevents him from sinking deep into the snow. His immense horns are not used to scrape away the snow which covers the lichens upon which he feeds. He does this with his nose. His horns are used solely in fighting. He sheds them every November. A full-grown stag weighs about five hundred pounds.

"September and October are the months for deer-stalking. Some knowledge of the country and the assistance of good Indian guides is necessary. There are favorite hunting-grounds where this exciting sport can be enjoyed in perfection. One of the best of these is the 'barrens' overlooking Grand Lake, opposite the northern end of the island.

THE "BARRENS," — HAUNT OF THE CARIBOU.

"The caribou has a wonderful power of scenting a person at a very great distance. He can be approached only by the help of a regular Indian hunter."

"Newfoundland, like Ireland," added Miss Gray, in conclusion, "has no frogs, toads, or lizards; but it has long been noted for its dogs. The Newfoundland dog, the friend and guardian of children, has for years been highly prized the world over. When the Prince of Wales

visited the island (1861), a splendid dog of pure breed was presented to him, which he appropriately named Cabot. It is very doubtful if the islanders could make many such gifts to-day. They have dogs without number, but most of them are such wretched curs no sane person would care to have them even as a gift."

LESSON XXXI.

A JOURNEY OF FOUR THOUSAND MILES.

Part I.

MR. CARTMELL'S absence from home on business had interfered somewhat with the Travelling Club's work. When he returned to Lake View it was June, and the evenings were not so favorable for geographical study with lantern and slides.

One evening he astonished his family by declaring that he had a great desire to take a trip to some new places, and he preferred not to go alone.

"Then take me," cried out Nellie.

"You!" exclaimed Fred. "How absurd!"

"I would like to see something besides Lake View," pleaded Nellie, climbing into her father's lap.

"Did n't you go to the seaside last summer?" asked Florence.

"Yes; and that good time makes me wish to go off travelling again."

"You are just like older people, Nellie," said her father, whispering something in her ear. Nellie's blue eyes at this opened wider than ever before, and she began to clap her hands and shout, "Good! good!"

All the children eagerly desired to know what was about to happen. Their great curiosity only made Nellie the more and more pleased. Mr. Cartmell soon satisfied them by announcing his intention of taking them all on a long, long journey through Canada.

"Will Miss Gray and Mother go?" eagerly asked Fred.

"I hope so," said his father.

In about a week all needed preparations were made, and the Cartmell family took the train for Boston. There they embarked upon a steamer for St. John, New Brunswick. This steamer in the summer stops at Annapolis, Nova Scotia, where the train is taken for Halifax.

On the trip from Boston to Halifax, Mr. Cartmell explained that he had engaged for this long journey a home on wheels with all the comforts they were accustomed to in Lake View. This was nothing less than a special Pullman car similar to the cars used by the higher officials of the road. To do this, of course, cost a considerable sum of money and the favor of one of the directors of the road. He hoped they all would find the arrangement such as to afford the greatest comfort and pleasure in travelling.

The party, on their way from Annapolis to Halifax, passed through the scene of Nova Scotia's well-known romance.

"The romantic history of what country is better known than its real history?" asked Miss Gray, soon after leaving historical Annapolis.

The children could not think, and Mr. Cartmell began to repeat slowly, —

"'This is the forest primeval. The murmuring pines and the —'"

when George cried out, "The land of 'Evangeline.'"

CAPE BLOMIDON.

When the conductor announced, "Grand Pré," Mr. Cartmell and his friends left the train to visit this interesting place, the scene of Longfellow's favorite poem. Miss Gray was especially enthusiastic, because she admired the poem so much, and never was able to find satisfactory pictures of the country.

They found the village to be a mile from the station, and situated on Mina's Basin, an arm of the Bay of Fundy. This little village contains one street, partly concealed from view by trees, which evidently do not belong to the

"murmuring pines" of the "forest primeval," as they are too small in size. Beyond the village is the winding shore and the rich meadow-lands, mostly reclaimed by dikes. Beyond these rises a bold headland, from whose summit a fine view is obtained of the villages, orchards, and white, comfortable-looking farmhouses of this once happy valley. The name of this headland is Cape Blomidon.

It is a remarkable fact that Longfellow never visited the scene of his beautiful poem "Evangeline," giving as a reason that he feared a visit would mar the picture his vivid imagination had formed of the place and people. Descendants of Connecticut Yankees are now said to occupy the land once belonging to the peaceful Acadian farmers.

After leaving Grand Pré, Mr. Cartmell entertained the children by telling them about the rise of water in the Bay of Fundy.

"On the Atlantic seaboard," said Mr. Cartmell, "near Halifax the tide rises about six feet, or a little less than it does at Boston. After passing Cape Sable, the southern end of Nova Scotia, the opening of the Bay of Fundy may be said to be gained, and here the tide is found to be about three feet higher. Farther up the bay, at Yarmouth, the tide reaches sixteen feet at high water, at Digby twenty-seven feet, at Parrsboro forty-three feet, and at the head of the Bay of Fundy — the eastern branch instead of the western — the tide often reaches seventy feet above low-water mark."

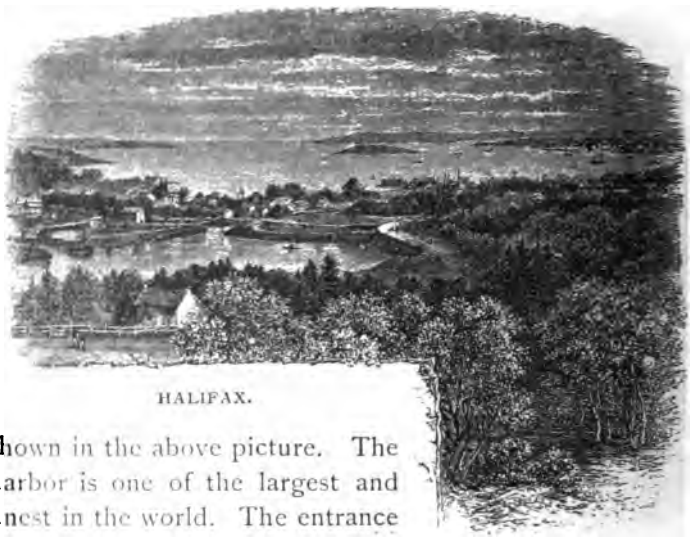
"The St. John River, which flows into this wonderful bay opposite Annapolis," added Miss Gray, "has one peculiarity likely to attract every stranger. When the tide is out and the water low, the river shows falls seven-

BAY OF FUNDY.

teen feet high. At high water the fall is in the opposite direction, the incoming tide causing the water to rush up stream. During a period of twenty minutes a steamer can pass directly over the spot where the river a few hours before was seen dashing down the rocks in a sheet of foam."

On reaching Halifax rather late that night the family drove at once, not to the hotel, but to the palatial car standing on a side track not far from the station.

The next day was spent in visiting different parts of Halifax. Mr. Cartmell took his family first to a high elevation back of the city, from which they obtained a fine view of the city and the harbor. A part of this view is



HALIFAX.

shown in the above picture. The harbor is one of the largest and finest in the world. The entrance to it is protected by numerous large forts. The city stands on the slope of a hill, and the scenery around is very picturesque.

"The four-thousand-mile trip over the Canadian Pacific railroad," said Mr. Cartmell the next day, "commences really at Halifax on the Intercolonial railroad. This road runs from the above city to Quebec. It was built by England to develop the resources of this part of Canada, and to unite them more strongly with the central parts at Montreal and Ottawa. No expense has been spared in the construction of the railroad."

It was a bright and delightful morning in early June when the Pullman car "Cacouna" began its long journey.

As the whole family had the entire car, there was no trouble about getting all the best views. All the windows were at the disposal of the eager sight-seers.

After leaving Halifax, the scenery soon began to attract the attention of all. Numerous charming lakes were

PULLMAN PALACE-CAR "CACOUNA."

seen, containing many islands, and various rivers crossed, whose strange names the children had some difficulty in pronouncing.

They soon passed through Truro, at the head of the southern branch of the Bay of Fundy, and then they came to Moncton, in New Brunswick, at the head of the northern branch of this celebrated bay.

When they reached the latter town George said, —

"I understand the contrast is very striking here between the vast expanse of almost dry ground when the tide is

out and the area of water, where the largest ships can float, when the tide is at its height."

At Newcastle the road crosses the Miramichi River, noted for its striped bass, salmon, and beautiful scenery. Here George obtained near the station a photograph of a view on this river. A part of the pictures he purchased on this trip are given in the text.

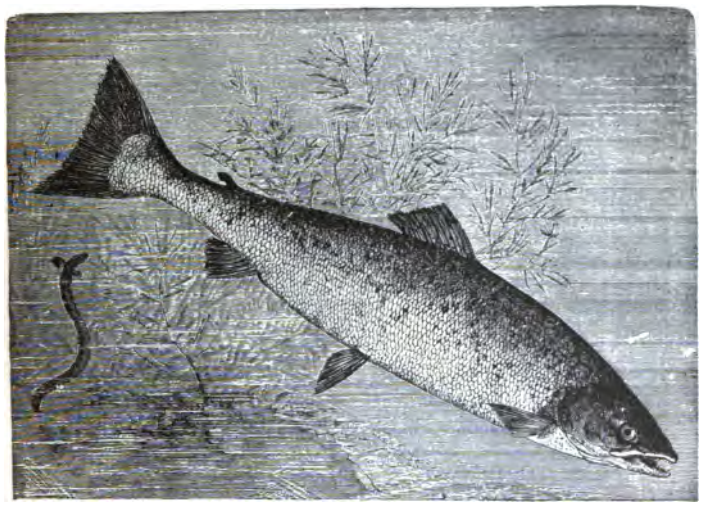
ON THE MIRAMICHI.

After leaving the above place the scenery became very monotonous, and Mr. Cartmell ordered dinner served. When the dinner-bell rang, the family adjourned to the beautiful dining-room. They were all much surprised to find how homelike the dinner and service seemed, except for a little jarring from the motion of the train.

After dinner Miss Gray entertained the children by giving the history of the Bay of Chaleur, or bay of *heat*,

and the reason for its name; and Mr. Cartmell unrolled a large map of Canada, and pointed out where they were then travelling along the shores of this bay.

About nine o'clock in the evening they reached the little village of Dalhousie, on the Restigouche River, at the head of the above bay. Here the Pullman car was detached from the express, and run on to a side track.



THE SALMON.

The next morning Mr. Cartmell, Miss Gray, and the boys went by train for a day's sport, fishing on the Restigouche River, and the rest of the family in the morning sailed down the bay on a private yacht.

Mrs. Cartmell was surprised to find such a charming summer resort so far from the great centres of population. The girls greatly enjoyed the clear air, pure water, and fine scenery. The ride down the bay among the islands

was a constant delight. In the afternoon they went to ride on shore. They found the hills were piled up to great heights, one above another, rising directly from the water's edge.

THE CASCAPEDIAC RIVER, NEAR CHALEUR BAY, CANADA.

The fishing-party returned about eight in high glee. They had never enjoyed such sport before. They had a dozen salmon, whose weight was twenty pounds each.

The paradise of the salmon-fisher is found in New Brunswick, in the Miramichi, and in the rivers which enter

this beautiful Bay of Chaleur. The bright, foamy waters of the Cascapediac, the Metapediac, and the Restigouche repay the sportsman by the good fishing and by the wild scenery which surrounds their long course through the forests of New Brunswick.

All were so well pleased with the first day's sport that another day was unanimously voted for fishing. This next day they went trouting, and returned at night with fifty fish, averaging three pounds each.

"I think it would have been better," remarked Mr. Cartmell, "if the Indian name for these waters had been retained, — namely, 'Bay of Fishes.'"

Early the next morning the "home on wheels" again began to move on towards Quebec. The first of the way was up the Metapediac valley, in the Province of Quebec. The scenery here was on almost as vast a scale as in the Alps, but softer and more charming in its effects.

Shortly after leaving this beautiful valley, the line nears the great river, the St. Lawrence, and runs along the south side of this moving body of fresh water for two hundred miles till it reaches the terminus at Point Levi, opposite Quebec. About noon a short stop was made at Cacouna, the fashionable watering-place of the Dominion. The children found here plenty of opportunity for various enjoyments, such as bathing, boating, and fishing.

Their Pullman was run into a car-house at Point Levi, and the family went across the ferry to spend a week in Quebec. Part of this time was taken for a trip down the St. Lawrence to the Saguenay River. What they saw here and in Quebec is described in another part of the book (see pages 153 and 198).

LESSON XXXII.

A JOURNEY OF FOUR THOUSAND MILES.

Part II.

AT the end of over a week most delightfully spent at the St. Louis Hotel, Quebec, in the manner described in Chapter XXVIII., the Cartmell family entered again their pleasant home on board "Cacouna." The ride from Quebec to Montreal, one hundred and seventy miles, was the least interesting part of the trip, and much of the time was spent in studying and looking at pictures of Montreal.

Three days were passed in Montreal at the palatial Winsor Hotel. Then the car was taken for Ottawa.

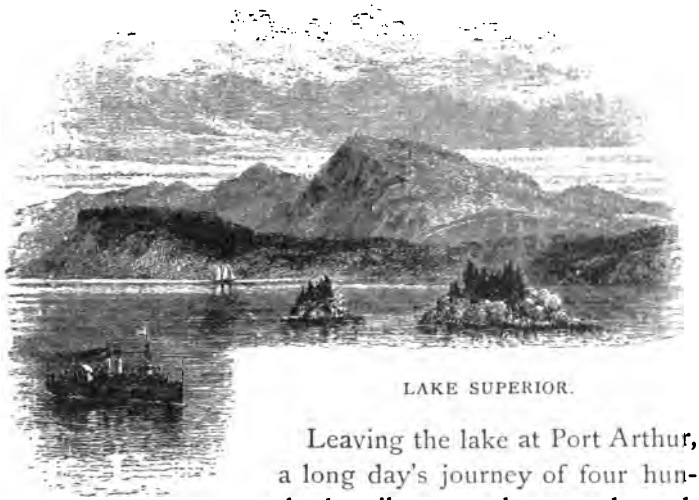
After leaving the Ottawa River, the route carried them at first through a heavy-timbered country and by many beautiful lakes. Then they came where scrub bushwood and rocks were abundant.

The first view of Lake Superior was seen at Heron Bay, near the most northern point on the lake. George was greatly interested in the engineering work along the northern side of the lake, it was so very heavy and costly. In many places the road was tunnelled for long distances through hard granite rocks.

"Do you know, Father, how much it cost per mile to build this part?"

"I have been told that it cost over seven hundred thousand dollars per mile, but the statement seems incredible."

Beautiful views of the lake were constantly seen.



LAKE SUPERIOR.

Leaving the lake at Port Arthur, a long day's journey of four hundred miles was begun, through woods, by lakes, and over the endless meadows of Manitoba. For most of the way the views from the car windows consisted of the long prairie grasses and few trees.

Two days were spent in Winnipeg, the palace-car being occupied as their home each night.

Leaving Winnipeg at the end of the time just mentioned, the party started for a nine-hundred-mile run over the prairie. Looking out of the window of the car, they see grass and flowers, waving grain, and orchards of fruit.

"Do you know what was once in place of all this rich and beautiful vegetation?" inquired Miss Gray.

"I don't know," said Florence; "but the country seems almost like an ocean."

"It was once a great inland sea. Over this ocean floated icebergs, carrying great rocks, and dropping them as they passed along."

"A few years ago," said Mr. Cartmell, "the buffaloes used these bowlders for scratching-stones, and many of them became well polished."

"I saw," said Fred, "near Winnipeg nearly all the buffaloes now left of the millions which once roamed over this country. It was a very small herd."

Nellie thereupon wished to know what had become of the great herds once so common.

Fred replied, —

"For twenty years hunters killed them merely for the sport and their hides. The buffalo was a stupid beast; and if the hunter took a little care not to show his head, he might fire into a herd while his powder lasted without the herd moving away. In one season Dr. Carver, a famous shot, is said to have killed five thousand to his own rifle. In this way half a million were killed sometimes in a single year.

"One year the American soldiers, it is said, instituted a grand hunt, and stationed themselves along the forty-ninth parallel to kill the buffaloes when they passed north into Canada. So well was this hunt carried out that thirty-two thousand were then slaughtered."

From the train the children frequently saw the skulls and bones of these great animals lying in the grass. At some of the tanks where they stopped to water the engine heaps of bones were seen ready to be sent to sugar refineries.

Tracks made by former herds of buffaloes were frequently seen crossing and recrossing the plains.

"Papa, what are those high buildings?" inquired Nellie.

"They are Ogilvie's elevators for storing grain. He is the great miller of Canada."

THE THREE SISTERS, CANMORE.

At Regina appeared some of the mounted police who look out for the peace of the northwest territories. There are five hundred of these fine red-coated cavalry.

The farther west they went, the more sandy and barren became the land. By-and-by the line descended into the valley of the Saskatchewan, and a short stop was made at Medicine Hat station. As they went up the incline be-

yond the river, an Indian on his pony raced the train, and seemed greatly pleased because he got ahead and dared to cross the track in front of the engine.

The elevation has increased now to about twenty-five hundred feet. The air is bracing and crystal-clear. At Calgary several Blackfeet Indians visited the train. They adhere to their native dress, wearing a kind of tunic, leggings with colored fringes down the back of the leg, and a bright-colored blanket.

ROCKY MOUNTAINS FROM NEAR CALGARY, CANADA.

Here the foot-hills of the mountains are seen, and the scenery improves, especially at Calgary and Canmore.

The children were interested in the strange names along the route called out by the porter. Some have been mentioned. Others were Swift Current, Portage la Prairie, Elkhorn, Whitewood, Kamloops, Moose Jaw, Crowfoot, Boston Bar, The Gap, Castle Mountain, The Three Sisters, and Kicking Horse Pass.

As the travellers approach the Rocky Mountains, they come into the grazing section of the country. South of

the line is one of the finest ranching districts in America. Fort McLeod being the centre.

The first view of the mountains is especially enhanced, because it is so long since hills, or steep ground of any kind, has been seen, except the cut banks of rivers.

The Cartmell family obtained their first distant view from a point beyond Calgary, near the close of a pleasant day.

BANFF.

"How grand!" they all exclaimed, as the lofty peaks, white with snow, towered into the clouds, rising directly from the plain, and stretching away one hundred and fifty miles to the right and left.

The first place of interest on the eastern side of the Rockies is at the foot of the Twin Mountains, where there is now a comfortable hotel called the Banff Hotel.

A little beyond Banff the powerful engine brought the luxuriant car into Summit Valley, fifty-three hundred feet above the sea. This valley appears to be quite

KICKING HORSE PASS.

wide at first, but by-and-by it contracts into a very narrow defile called Kicking Horse Pass. It was so called in 1858 by Dr. Hector, an explorer, who near there received a severe kick in the chest from his horse. In memory of the discoverer it ought to be called Hector Pass.

Here the trees are small and the valleys and mountains have a barren appearance for want of sufficient moisture, but the distant views of lofty peaks are truly magnificent.

Fred discovered that in some places there is barely room for the railroad and the river; in another place the

MT. STEPHEN.

mountains overhang the track, and the train passes through tunnels on the verge of precipices.

George reported that on regular trains a huge locomotive, with ten driving-wheels and weighing one hundred and seventeen tons, was commonly attached to the back of the train to hold it back. Eight extra men are placed on each car to manage the brakes. In case a part of the train should become detached, there are safety side-tracks arranged at short distances with upward inclines and the

switches so placed that a car would turn off on one of these side-tracks and come to a standstill by its own action.

Mr. Cartmell at the right time invited all to take seats on the rear platform, as that was the choice place from which to get the best views.

In descending the abrupt western slope of the Rockies proper, the railway track runs across trestle-bridges spanning deep ravines and round sharp curves.

Some of the views in this part of the journey were found to be really startling. The one which made the deepest impression was that of Mt. Stephen.

This peak, rising eight thousand feet higher than the railroad track, is hidden completely, when they begin to descend, by an intervening mountain. As the train speeds rapidly on the down grade away from the base of the mountain, Mt. Stephen begins to rise over the intervening mountain into the blue sky, deliberately lifting itself upwards as the great rocky curtain is lowered.

Every one who saw this sudden transformation, even little Nellie, was thrilled with emotions of surprise and wonder.

After a while the valley became narrower and deeper; the river roared between steep rocky walls, almost splashing the car as it passed. The noise of the torrent and the rattle of the train blended into one loud roar. Nothing but river and railway, smoke, spray, and steam can be seen. Then suddenly the light became stronger, the great roar was hushed, and the delighted party emerged from the savage cañon into the wide, smiling valley of the Columbia. They had descended forty-three hundred and sixty feet, from the regions of snow and ice into an almost tropical climate.

LESSON XXXIII.

A JOURNEY OF FOUR THOUSAND MILES.

Part III.

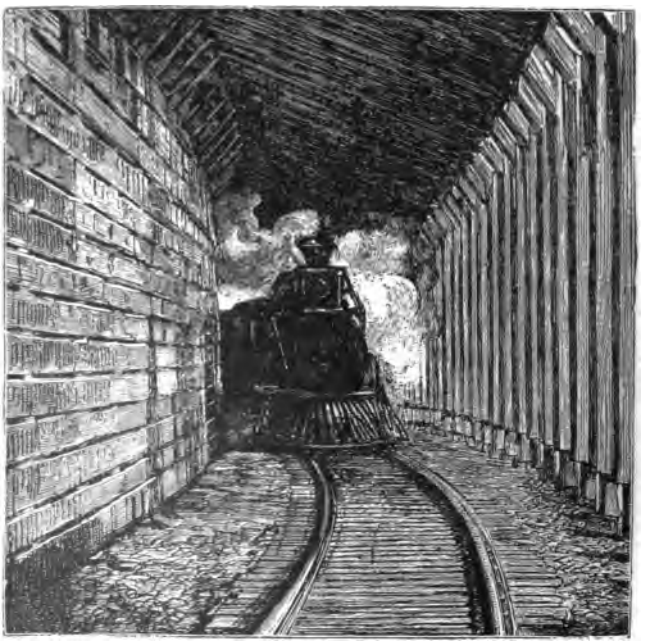
"THE next range to the west is called the Selkirks," said Mr. Cartmell.

"These mountains occupy the whole region inclosed by the great loop of the Columbia and Kootenay Rivers. It was a long time after Dr. Hector discovered his pass in the 'Rockies' before any way of crossing the next range to the west was found. Men were employed for years searching for these passes. The pass over the Selkirks was finally discovered by Captain Rogers; but there was another lofty range to the west blockading the way.

"One of the most enterprising explorers had about given up the likelihood of ever finding the desired route, when he observed one day an eagle rise from a lake and fly westward. He thought, 'Perhaps that bird knows how to cross the lofty range of mountains.' He slowly followed in the same direction, and found the pass appropriately called Eagle Pass in the Gold range. Then the Canadian Pacific railroad became a possibility."

The children were frequently disgusted by having the prospect cut off by miles of snow-sheds. They no sooner were out of one snow-shed and were enjoying the beautiful scenery than they plunged into another shed. These

sheds are built of massive timber, and are necessary to keep the road open in winter. They cost the railroad over one million dollars. In some places the road has built a track outside the shed for summer use.



SNOW-SHEDS.

Just beyond Rogers' Pass our travellers came to the most interesting part of their journey as far as magnificent scenery is concerned; so Mr. Cartmell ordered the Pullman car side-tracked at Glacier House for over a week.

Glacier House is situated in the upper valley of the Illecellewaet (pronounced *Illy-silly-wat*, meaning "rush-

ing water"). Here the railroad line passes very near the base of a great glacier, and huge mountain-peaks and many glaciers as fine as those in Switzerland can be seen near at hand.

During the ten days spent at this place the girls and Mrs. Cartmell took short walks to the points of interest

THE GLACIER IN THE SELKIRKS.

within five miles of the car; Mr. Cartmell, Miss Gray, and the boys attempted some more difficult climbing. George took his camera with him wherever he went, and took a good many pictures of the remarkable scenes.

Mr. Cartmell's experience in mountain-climbing in Switzerland was of great help to him in this country. He joined with an Englishman stopping at the Glacier House on several long and difficult tours, the most important of

MT. BONNEY IN THE SELKIRKS.

which was the ascent of Mt. Bonney. A fine picture was obtained of the mountain from the camp where they slept the night before.

This mountain is over ten thousand feet in height, and over six thousand feet above the hotel. They were several days reaching the top, on account of the difficulties encountered.

A photograph was taken of the snow-capped peak, and shows how different the top of a mountain looks when it is finally reached from what it does at the usual distance near the base or on other mountains.

The view was superb, — a perfect ocean of peaks and glaciers all cleft by valleys. Mr. Cartmell and all the others were very sorry to bid good-by to the American

THE TOP OF MT. BONNEY.

Alps of the Selkirks, but there were other places of interest to visit, and their time was limited.

Their Pullman was attached one morning to the rear of the westbound train, and they started down the valley of Illecellewaet.

As usual the train descended through a series of loops or zigzags. Looking backwards, fine views were obtained up the valley towards the Glaciers of Mt. Bonney, and equally good views of the twin peaks, Sir Donald and the Syndicate.

The main stream was here joined by its north fork, and the combined torrent foamed and surged through a deep

cleft in the mountain. Fred and George tried to measure the distance to the bottom of this gorge by dropping down stones and counting the seconds it took them to descend. The valley of the Columbia, west of the Selkirk range, was soon reached. It is much wider than the valley east of these mountains.

On its farther shore rose the Gold range, crowned above the forest line by snowy peaks. They crossed the river by passing over a fine bridge, and began the ascent to Eagle Pass, enjoying all the way lovely views of the Selkirks from the rear of their car.

Descending from Eagle Pass, they skirted in the evening for many miles the placid waters of the Shuswap Lake, with its mirror-like surface and sombre woods.

"Papa, see the flocks of ducks!" exclaimed Nellie.

"This would be a good place for a few days of hunting and fishing, if we only had the time."

Beyond the lake they entered the valley of the Thompson River, and soon passed through the town of Kamloops, an old-established settlement of the Hudson Bay Company. This river was named after David Thompson, who explored this part of the Rocky Mountains in 1808, in the interests of the fur business.

The Thompson River is a branch of the Frazer. A ride of a few miles farther down the valley of the former river brought our travellers to the junction of the two rivers. Miss Gray thought the scenery in the cañon of the Frazer the finest on the whole journey. For miles the track is laid on ledges, or on trestle supports against the face of the rock, or in cuttings and through tunnels, at a height of one hundred and fifty feet above the foaming river.

THE NORTH THOMPSON RIVER.

Again and again Miss Gray spoke about the magnificence of the scenery. "Notice," she said, "not only are the mountains most picturesque, if not so high and grand as some others we have seen, but the lights and shades are exquisite, varying as they do from dark or purple to soft hues of gray. The variety in the foliage of the trees enhances the beauty of the scene; the dark green of the

Douglas pine contrasts well with the lighter shades of the cedars and hemlocks and the bold red of the maple."

George called the attention of all the party to the great numbers of bright red salmon hanging to dry on stages built on the jutting rocks above the river. He pointed out Indians crouching on scaffolds of long poles suspended by ropes from overhanging rocks, and patiently watching

TERRACES ON THE FRAZER RIVER.

their chance of catching fish in the huge launching-net plunged at random into the swirling eddies of the foaming river.

"Why is this river called the Frazer?" Mr. Cartmell asked.

"After some man, I presume," said Florence.

"You are right. Simon Frazer followed the river in 1806 from the source to the sea, and gave to it his own

name. The story of his canoe voyage is one of thrilling adventure; and as we look down upon these foaming rapids we can realize to some extent the awful risk of shooting downwards in a birch-bark canoe, when all ahead was quite unknown."

Just before reaching Yale all noticed the celebrated terraces on the Frazer River.

Fred wrote out in his note-book the following description of this part of the valley: —

"The terraces on the Frazer River, above Yale, — or benches, as they are sometimes called, — are exactly the same height on each side of the river. In most places there are three tiers. The lowest of the tiers where the valley expands presents a perfectly flat surface often many miles in extent, raised some forty or fifty feet above the level of the river's bank, with a sloping front like a railroad embankment.

"The second tier is generally cut out of the mountain-side, and is seldom more than a few acres in extent, and raised sixty or seventy feet above the lower one. The third tier is some four hundred feet higher at a great elevation along the face of the bluffs.

"These terraces are quite uniform, of even surface, and composed of sand and gravel. Gold in small quantities is found in all of them, and a few scattered pines and bunch-grass grow upon them.

"The ascent of the Selkirks from the Columbia River to Rogers' Pass is very steep. The track is laid along the face of the mountain, overlooking the river. The gorge is very narrow, and the scenery of the grandest description. Snow-capped peaks are visible on all sides, their lower slopes being clothed with magnificent pine forests."

Miss Gray called the attention of all to the greater moisture in the Selkirk Mountains than among the Rockies. This was shown in the greater amount of snow which falls in winter, and also in the greater abundance of vegetation. The forests in the Rockies are more or less open, and horses can go anywhere. The forests of

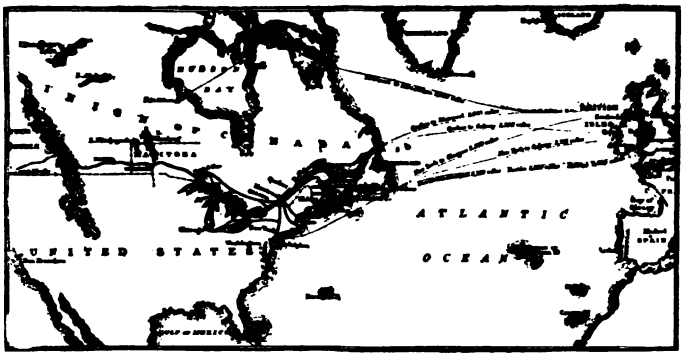
VIEW FROM ESQUIMALT, VANCOUVER ISLAND.

the Selkirks are almost impenetrable, on account of the luxuriant undergrowth.

The Travelling Club found it much more interesting to gaze upon the real scenes in nature than to look at pictures. Yet they wished to carry away a photograph of every fine view, so as to remember the scene all the better. George took a great many views in British Columbia. Some of the finest are presented in this chapter.

The palace-car was taken off again at Yale, so they could for a day or two enjoy the scenery of the Cascade range, and have a little salmon-fishing.

Yale was found to be completely surrounded by mountains, the white cottages nestling in the protecting arms of the lofty peaks. Before the Canadian Pacific was built, it was the head of an important river navigation. The stern-wheel boats made the trips from Victoria in two days.



MAP OF CANADIAN PACIFIC RAILROAD AND SEA ROUTES.

The run from Yale to Vancouver passes through some fine scenery, and then enters a flat, heavily forested country, where the pines grow larger than the children had ever seen before. At half-past one, or half-past thirteen o'clock, as time is reckoned on this road, they reached Vancouver, on the Gulf of George, which is now the real terminus of the line, and the end of the four-thousand-mile journey. The first thing they saw was a steamer from Japan discharging tea at the wharf, some of which

tea was to be sent over the railroad and by steamer to England.

"Thus an entirely new route of commerce has been opened within a few years," said Mr. Cartmell. "It may increase in importance as the years pass on, for it is the shortest and most direct way from London to Japan and China."

The map on page 251 shows the shorter routes.

LESSON XXXIV.

OFF TO MEXICO.

"WELL, my dear children, we have selected for our first meeting after the trip over the Canadian Pacific the sister republic on the south. Can you tell us, Fred, its name?"

"I think you mean **Mexico**."

"Yes. Can you name one way of going to the City of Mexico from Boston? Point out your way on this large railroad map."

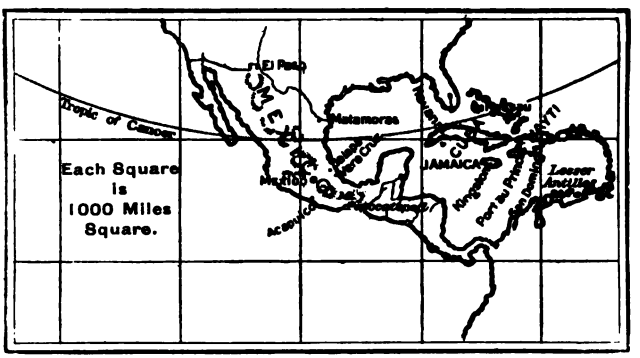
"I would go by the Boston and Albany railroad, New York Central, Michigan Central, to Chicago; then the Atchison, Topeka, and Santa Fé road to El Paso, on the Rio Grande, and the Mexican Central for the rest of the journey."

"That is one way of going. Florence, can you tell of a different route?"

"I should prefer to go from Boston by the New York and New England railroad, and the Pennsylvania road to

Pittsburgh; then by the Pittsburgh, Cincinnati, and St. Louis railroad to St. Louis, going the remainder of the way over the same route Fred selected."

"It would take eight days to go that way, and the distance is about four thousand miles.



MEXICO AND THE WEST INDIES.

"Travelling on the water in summer is usually pleasanter than riding in the hot and dusty cars, so I would prefer to take a steamer down the Mississippi at St. Louis for New Orleans, then change to a steamer of the Morgan line across the Gulf of Mexico for Vera Cruz."

"How does the city of **Vera Cruz**, or 'the True Cross,' look from the sea?" Fred inquired.

"It presents a lovely picture from this direction. The outlines of the city, including church towers and domes surmounted by bright crosses, stand clean cut against a great sand-bank below and a full blue sky above. Here and there rise stately palms, while snow-white houses adorned with colored Venetian blinds are seen in the fore-

ground. Between the sand-dunes and the horizon rise lofty mountains for a stately background.

"Away to the left rises in clear weather the glorious volcano of Orizaba, whose profile is sharply cut against the blue sky. The Spanish sailors gave this peak the very appropriate name of the 'Star of the Sea.'"

VERA CRUZ.

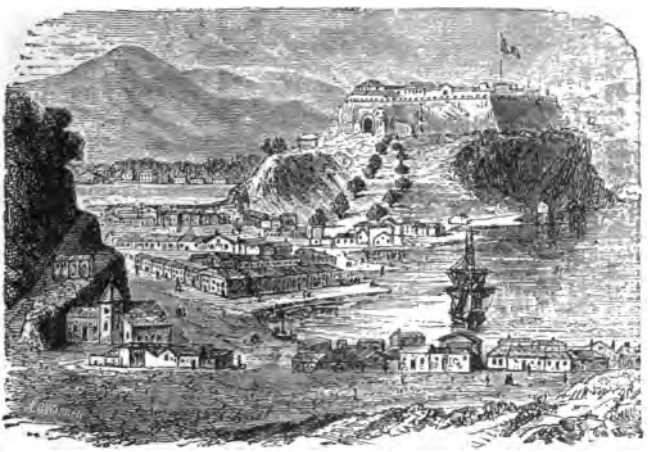
"Tell us a little, please, about the *city* of Vera Cruz."

"The most interesting part of the city is the Plaza, around which runs a broad paved street, laid out with walks, grass, and beautiful trees.

"This city is considered the hottest and the most unhealthy place on the globe; but, strange to say, it is one of the cleanest. The streets are white and clean, and the gutters usually free from filth.

"If any refuse should escape the eye of the authorities, the flocks of vultures, or black buzzards, would be sure to

swoop down from the buildings around and pick it up. They act as street scavengers. They are a necessary evil here, as well as in India, and they perch in long rows on the roofs of the houses. Seemingly lifeless, these birds remain for hours motionless on the ridge-pole of lofty buildings or on the crumbling walls of palaces long in ruins. Woe



ACAPULCO, WESTERN MEXICO.

to him who lays profane hands on any one of their number. He would certainly be either heavily fined or sent to prison."

"Did you not say it was very unhealthy?"

"The dreaded disease in this hot city is the black vomito, or, as it is generally called, the yellow fever, which usually rages here for eight months of the year. Forty deaths a day from yellow fever and small-pox are not an uncommon number. It does not usually attack the

natives of the city, but it frequently carries off the Mexicans who come from the more elevated and healthy parts of the interior."

"Is there any other port, Papa?"

"Yes, **Acapulco**, situated on the Pacific coast three hundred miles from the capital, Mexico. It has a picturesque, noble, land-locked harbor, well shown in the picture. It is a coaling-station for Pacific mail-steamers, and exports hides, cedar, timber, and fruit, sending to San Francisco large quantities of limes each month.

"It has of late years declined in trade, but in olden times it was a busy port. The grand old galleons which carried the riches of the Indies to Spain entered its waters with cargoes each one worth millions of dollars. From hence they were transported by a thousand mules and donkeys to Mexico and Vera Cruz. From the latter city they were reshipped to Spain. These cargoes consisted of calicoes, silks, spices, muslins, and jewels."

"Bret Harte," added Miss Gray, "gives a vivid picture of these days in his 'Lost Galleon': —

"'In sixteen hundred and forty-one
The regular yearly galleon,
Laden with odorous gums and spice,
India cottons and India rice,
And the richest silks of far Cathay,
Was due at Acapulco Bay.

"'Due she was, and over-due,
Galleon, merchandise, and crew,
Creeping along through rain and shine,
Through the tropics, under the line.'"

George then threw upon the screen a profile of the country of Mexico, a copy of which is shown on the next page.

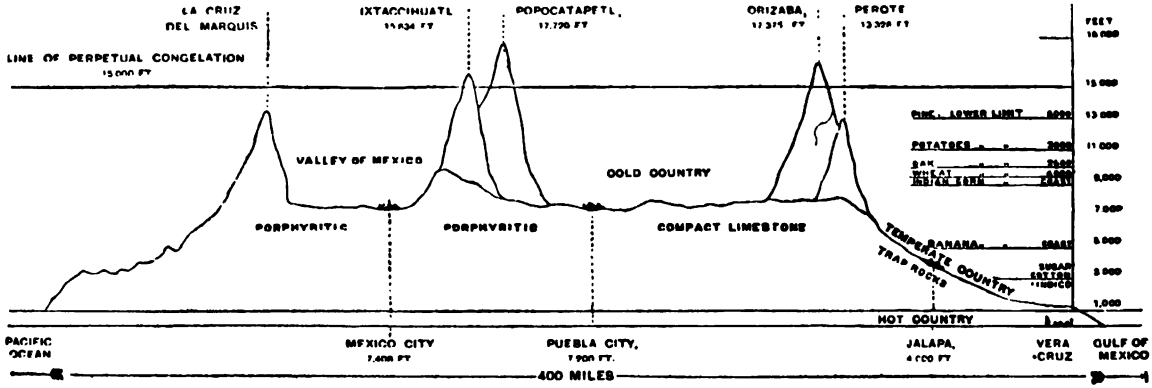
"This map," he said, "shows a section in profile across the country from east to west, beginning in the Gulf of Mexico at Vera Cruz, and crossing so as to include Puebla and the City of Mexico. These elevations are usually divided into three parts, according to the temperature and vegetation. The lowest part, nearest the coast, is called the *hot country*. It is in the main very unhealthy. Wherever water is found, the trees and plants and fruits of the tropics are produced in abundance. Bananas, vanilla, cocoa, cacao, spices, sugar-cane, mangoes, and oranges abound. The characteristic plant is the tall cocoa-palms, waving their long leaves in the wind.

"The next belt rises from one to four thousand feet high, and is called the *temperate region*. Vegetation is profuse; the entire surface of the soil is covered with gay flowers and long vines, and with tall yuccas, palms, and tree-ferns."

"How beautiful it must be!" exclaimed Florence.

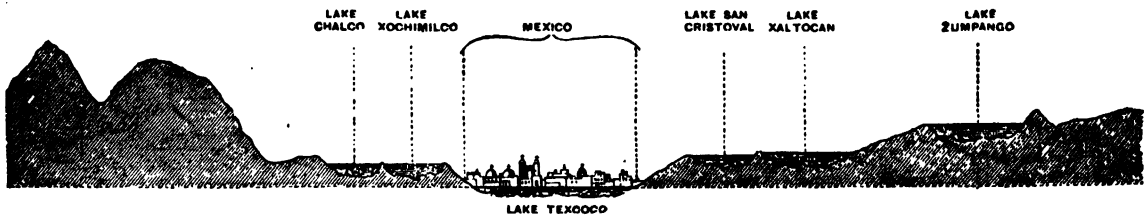
"Here is seen," continued her brother, "on every hand a mingling in temperature and plant-life of two zones, giving the country the very appropriate name of '*tropic borderland*.' In this middle ground the flowers do not lose their scent, nor the birds their tuneful song, as in the pure tropics. All the fruits of the old and the new world may be grown here in greater or less perfection. If paradise can be located on the earth it will occupy a like position in some belt half-way up a tropic mountain.

"The *cold country* is the name of the third belt, over five thousand feet in elevation, and including the great

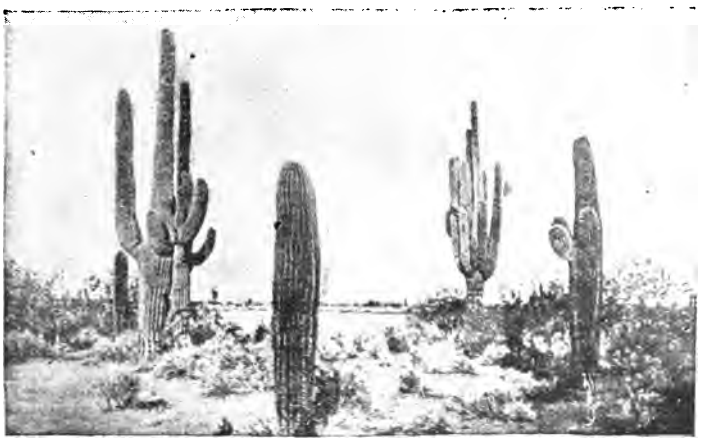


6.—SECTIONAL PLAN OF MEXICO, FROM THE PACIFIC TO THE GULF.

From Map by S. A. Mitchell, 1847



central plain of Mexico. In this third zone, although near the equator, the elevation above the sea, and the snow upon the surrounding lofty peaks, tend to render the climate delightful. There is a freshness and briskness in the air, however hot the sun may be. It is perpetual spring there.



CACTI.

"The vegetation in the cold region is similar to that found in various parts of the United States. The prevailing fruits are oranges, peaches, and apples; the grains are wheat and barley; the trees, oaks, pines, and hemlocks; the peculiar vegetation, aloes, cacti, and cypresses. The cities Puebla and Mexico are in the midst of this colder section. Above them rise lofty mountain peaks, on whose sides another climatic belt may be located, and named the *frigid*, or *coldest*, *country*."

"Papa, can a traveller easily see these three belts in the Mexican climate?" Florence asked.

"Yes, you can easily and quickly see them all by a **trip to the City of Mexico** over the Vera Cruz and Mexican railroad, following up the eastern slope of the country."

"Do you mean to tell us," said Fred, "that a railroad runs over the eastern Cordilleras directly from Vera Cruz to the city of Mexico?"

"I do. The road is two hundred and sixty-four miles long. It was built by an English company twenty years ago, and cost forty million dollars. It is a marvel of engineering skill, rising four thousand feet in twenty-five miles, and seventy-six hundred feet in the whole ascent. The locomotive used to move the train on these terrible grades resembles two engines locked together back to back, the chimney at the end."

"Do tell us more about the trip."

"I will ask Miss Gray to tell you."

"The traveller," Miss Gray began, "usually starts at midnight, so he may have daylight for the most interesting part of the journey. The ascent commences almost at the gates of Vera Cruz, but at first it is very gentle. In crossing the plains lying between the coast and the foot-hills, no villages are seen, and few houses except the ranchos of the cattle-owners.

"A few miles beyond Paso del Macho an iron cobweb bridge is crossed in the midst of rich and varied verdure, — reds and yellows, blues and greens, lichens and mosses, ferns and orchids, — so abundant and profuse as to tempt one to jump from the train to gather specimens.

"The views from these points, as you look back over the vast expanse left behind, are most impressive. Multitudes of good-looking cattle are feeding in the marshy pastures."

"I hope I can go there some day, Miss Gray."

"I hope you may, Nellie. Now we come to the most interesting part of the trip. About eighty miles from Vera Cruz lies the deep gorge of Metlac. If the engineers had crossed this deep valley in a direct line, they would have been obliged to construct a gigantic viaduct over one thousand feet long and four hundred feet high. To prevent so costly and dangerous a bridge, they ran the line down one side of the creek towards the head of the gorge, crossed it by an iron bridge with the shortest curve they dared to make, and ran it up the other side through some short tunnels.

"Beautiful views are here constantly gained of the extinct volcano Orizaba. The curves of the road bring its white height first on one side, then on the other. The town of Orizaba stands on the top of verdure-clad hills, four thousand feet above the sea. The peak of Orizaba rises twelve thousand feet higher, glittering like a sugar-loaf against the dark blue sky."

"Please go on, Miss Gray, it is so interesting," exclaimed Fred.

"A few miles more and the train reaches 'Little Hell,' — a chasm that divides the craggy steeps, whose depths one can scarcely measure with his eye. Travellers feel dizzy in gazing down into it, and the Indians in passing keep muttering their prayers.

"At La Joya the trains pass one another, as the road has a single track. The travellers in the first train to arrive see the other train approaching like a child's toy high in air. It slowly passes along the summit of the mountain, frequently appearing and disappearing before it zigzags into the station."

"Can a person buy in the train fruit to eat?"

"The trains are met in the mountains, wherever they stop, by Indian girls bearing baskets of fruit, such as peaches, oranges, pineapples, pears, and pomegranates. Peach-trees line the track, and all the houses have fine gardens."

"Does the train go up any higher?"

"Beyond La Joya the track really *climbs* the side of the mountain by approaching it in great curves, rising thirty-six hundred feet in one and a quarter hours, and reaching the highest point one hundred and seven miles from Vera Cruz and seventy-six hundred feet above it. Here an extra wrap is desirable by day as well as by night, it is so much colder on account of the height. The town of Apam is soon reached, the plains of which are covered with the maguey-plant and haciendas for making pulque (*pŏol'-kā*).

"From this point the track goes down a gentle decline to the city. At certain places fine views are obtained of the city of Mexico in the open plain below."

LESSON XXXV.

THE PEOPLE OF MEXICO.

"DO the **people** of Mexico all look alike?"

"Oh, no; they differ fully as much as the people in this country. There are at the top of the ladder the whites, or *creoles*, descendants of the haughty Spaniards. The men are gentle and refined, but vain and passionate. Their flashing and piercing eyes are black, like their hair and beard.

"The women are often very beautiful, with dark complexions, large, dreamy eyes, long eye-lashes, delicate, graceful forms, and small hands and feet. The lace mantilla usually worn on the street gives to even a plain face the appearance of beauty."

A MESTIZO, OR HALF-CASTE.

George then said: —

"Next in importance are the mixed races, or *half-castes*. Most of these have a white father and an Indian mother. They make up about one half the population. They are of a light-yellow hue, with pleasant, fresh, and rosy countenances. The men usually wear wide trousers

of white or colored drilling, fastened round the hips with a bright girdle. Over their shoulders they wear a blanket-shawl, having a slit in the centre through which the head is put. On the head is usually worn a felt hat turned up at the brim, or a hat with a wide brim."

Then Florence read from a book: —

"The women seldom wear stockings, though their small feet are often encased in fancy slippers. They have loose, embroidered undergarments, and a woollen or calico skirt; while a narrow but long shawl is drawn over the head when they are not working, and covers the otherwise exposed arms and shoulders."

"These mixed races in Mexico," said her father, "unite many bad qualities, such as laziness and cowardice, revenge and treachery. They are the farmers, the muleteers, the herdsmen, the male and female servants of the country."

"What is a muleteer?" inquired Nellie.

"He is a mule-driver," replied Mr. Cartmell. Then he explained about the Indians in Mexico.

"About one third the people in Mexico are pure Indians. They are very different from the Indians in the United States.

"Their skin is brown, or olive-color. They have large ears, thick lips, low brows, and eyes somewhat oval. They are of medium height, and have slender arms, but broad chests.

"The men wear short, wide drawers of coarse cotton or deerskin; a frock of woollen cloth is fastened around the hips by a belt; a straw hat and a pair of sandals complete the suit. The women wrap themselves in a piece of woollen stuff that passes twice around the body and is

INDIANS AT THE MARKETS.

girded round the waist by a broad colored band. A wide garment, which is closed on each side, but made with two openings for the arms, covers the upper part of the body, and reaches to the knees. Each tribe is distinguished by its colors.

"These people are the porters and carriers of heavy burdens. They work in the mines carrying out the ore, and on the farms. They live mostly on vegetables and fruits."

Miss Gray then spoke about some of the manners and customs of the young people in Mexico.

"Boys and girls are not expected to stay away from the table when their elders dine, as English custom requires. Even on great occasions their places are reserved.

"Young people attend school, but the schools are far inferior to those in the United States. The school buildings are very poor structures, and the teachers are ignorant and usually inexperienced in teaching.

"At seven o'clock in the morning the pupils begin their school work. The larger children sit in chairs, others on benches, and many on the bare floor. They study together and aloud, chattering like magpies. They remain in school about ten hours each day. The best schools are the Institute at Toluca and the military academy at Chapultepec.

"Young people in Mexico are not allowed to enjoy one another's society with the same freedom as in our country. When young ladies go to a party or walk upon the street they are usually accompanied by their mother or some older person."

"Are the people of Mexico very polite?"

"They generally are in outward forms. In saluting ladies, gentlemen still use the Spanish form, and say, 'At your feet.' The response to this is, 'I kiss my hand to you.' In closing a letter they write, 'I kiss your hand.' Dancing is practised everywhere. The people are very easy and graceful in their movements."

Fred then related how the Indian men and women are often seen in the markets with great coops of chickens on their backs, or a dozen live fowls hanging with their heads downwards from their waists. Sometimes they bring these chickens eighty or a hundred miles in order to sell them.

PREPARATION OF TORTILLAS, MEXICO.

"What kind of food, Mamma, do the common people eat?" Florence inquired.

"They do not have chicken very often, I assure you. They live almost entirely upon black beans and ground maize, or corn-cakes. The latter are called in Mexico *tortillas*, and form the bread for the poor, and are never omitted from the tables of the rich.

"The labor of making them is very great. In a poor man's house the wife is occupied most of the day in preparing tortillas for her husband's supper on his return from work, and so she has little time to attend to her other household duties. In the mansions of the rich an expert woman is employed for the sole purpose of making these little cakes for the family."

"Do tell us how it is done."

"The process is as follows: A quantity of unground corn is put into a jar of lime and hot water over night. This jar is the small one in the front of the picture. The grain is taken from the jar in the morning, and placed upon a small stone bench, seen at the left of the picture. A woman kneels behind the stone, and with a long stone roller reduces the grain to a kind of paste. Then the woman rises, and makes the paste, by adding the right amount of water, into pancakes, which her sister bakes over a slow charcoal fire."

"Are they good, Mamma?"

"I tried some when the Mexican village was in Boston, and found them very tough and tasteless."

"I want to hear something about the *children* in Mexico, Miss Gray," said Nellie.

"That country is said to be an earthly paradise for children. They are tenderly loved, and carefully cared for. The little ones are happy by nature, and rarely quarrel. Their childish prattle in sweet baby-Spanish is very pleasant to hear. The boys often play horsemen, and the girls frequently play going to church.

"At home and at school the discipline is the mildest, — no scolding, no correction, no use of the rod or rattan. Yet these children grow up to be almost as polite as the

Japanese children. They never lead in talking. A Mexican boy is never too old to kiss his mother's hand every time he comes into her presence. She rewards him by telling him a pretty story."

LESSON XXXVI.

MEXICAN FARMING AND MINING.

"PAPA," inquired Fred, "what do the people of Mexico do for a living?"

"Nearly all of them either work in the mines or work on farms."

"Are their farms small, like ours in New England?"

"No, most of them are like the great estates in the West. They are called *haciendas*, and are sometimes made up of small ranches. Often they are about twenty miles long and eight to ten miles wide, containing from sixty thousand to one hundred and twenty-five thousand acres of land, and having on the estate a thousand or more cattle, hundreds of work-horses, pigs, and sheep without number. Thousands of dollars' worth of cheese and butter are yearly made on such a farm, and sent to market. Twenty thousand bushels of corn and seventy thousand bushels of wheat are raised every year. To carry on such an estate, there must be employed at least one hundred men and fifty boys and many women."

"Who looks after the men and boys?"

"They are directed by a superintendent, called a *major domo*, assisted by three captains. There are twenty herds-

men, each accompanied by a boy, who attend the cattle day and night. These officials always ride on horseback.

"The *peons*, or laborers, live on the estate, in small *adobe*, or mud, cottages. Usually they have one room, never more than two. There is a stone for a fireplace in one corner, but no chimneys, no windows. The family sleep on mats on the bare ground."

"Where does the owner live, Papa?"

MAGUEY.

"He lives in the great house near the centre of the estate, enclosed within high walls, with large, massive doors that are locked every night. In the centre of the outside walls is an inner court, open to the sky, entered by a wide archway, and where tools, wagons, and other property can be kept safe from thieves.

"Some of these houses are immense in size, being two hundred feet long by one hundred and twenty-five feet wide, surrounding the court, and with graceful towers at every angle. In the towers are bells to ring out the hours of work, or to give notice of fire or danger.

"Many of the haciendas are east of the city of Mexico, near the town of Apam, mentioned in a former chapter. On most of these great estates the chief article cultivated is the aloe, or 'century-plant,' called in Mexico the maguey (*măg'-ĕ*, or *ma-gwā'*)."

George explained the next picture as follows: —

"The maguey furnishes the people with leaves to cover the roofs of their houses, and from these leaves with paper, clothing, hammocks, and ropes. From the juice is made a kind of national drink called 'pulque' (*pŏol'-kā*).

"The maguey, or aloe, throws out shoots after two years' growth, which shoots are removed from the parent plant, and set out at the distance of a yard apart.

"When the plant is about ten years old it sends up a central stalk, which produces a number of beautiful flowers. The Indians know when the flower is about to appear, and they cut out the central portion of the stem, leaving a thick outside rind, which forms a natural basin two feet in depth and over one foot in diameter. Into this pail the sap oozes in large quantities day by day for two or three months.

"Each plant yields about one hundred and twenty gallons of this sweet liquid, even when growing on very dry land. Each day the collector of sap comes round with his donkey and siphon to gather the honey-water. On his back is a sheepskin or pigskin; two are on the donkey's back. He inserts his long siphon-gourd into the sap, and by suction fills the gourd, which is emptied into the sheepskin."

"What do they do with the sheepskins, George?"

"The sheepskins holding the aloe-juice are carried to

GATHERING PULQUE.

a building, where the liquid ferments, and it is then called pulque; in doing so it gives out a very disagreeable smell. This odor makes the drink very disagreeable to foreigners; but the Indians are very fond of it, and drink it to excess. Then they lose the use of their legs, and are obliged to sit down in the street or by the roadside for a while."

When George threw upon the screen the next picture, Nellie exclaimed, —

"I know what that represents. Miss Gray showed us such a pod at school yesterday."

"What is it, Nellie?"

"It is a cocoa-pod. Inside the pod are a great many small seeds,—a hundred or more, I should think,—and each seed contains that from which chocolate is made. I wish, Mamma, you would have cocoa to-morrow for supper."

Mrs. Cartmell promised to remember about it; and then she told them how travellers often take small cakes of cocoa with them when they go on long journeys to prevent hunger and fatigue.

COCOA-POD.

"The bark on a cocoa-tree," continued Mrs. Cartmell, "is smooth, and gray in color; the leaves are long and oval; the pod is four inches or more in length, and has a very short stem to join it to the limb of the tree. Within the pod and around the seeds is a soft, pulpy substance that has a pleasant, acid taste. The people of Mexico eat it with sugar as we eat oranges."

"The cocoa-trees," added Miss Gray, "are raised in orchards. They have to be shaded from the sun, and so banana-plants, which grow faster and higher, are set out among them. The banana will afford food and the needed shelter at the same time.

"If the farmer has killed the caterpillars, which eat the cocoa-leaves, and driven away the flocks of parrots, which

like the fruit, he will, after waiting a number of years, have a good crop of cocoa ready to harvest.

"When the pods are ready to gather, one set of negroes pull them off the trees with forked wooden sticks, and another set carry them to a shed, where the fruit is cut open and the seeds taken out with a wooden spoon.

GATHERING COCOA IN MEXICO.

"The seeds are first buried in sand, and then spread on mats in the sun to make them perfectly dry. When the seeds are quite dry, they are packed in bags made of the hide of the buffalo, and sent to Europe and the United States."

"How large are these seeds?"

"About three fourths of an inch in length."

"What do the chocolate manufacturers do with the seeds?"

"They roast them as we do coffee-berries, and then crush them under a roller into a fine powder. Sugar,

spices, and water are added so as to make a paste, which is pressed into any desired shape."

"Do you know, children," Miss Gray asked, "where the gardeners about the Mexican capital raise their vegetables?"

No answer was received, so their teacher gave them the needed information: —

"The city of Mexico is largely supplied with vegetables and flowers raised on the so-called '*floating gardens*' in the lakes near by. A species of water-weed grows very rapidly in these lakes, and after a time becomes so matted together that layers of turf and soil can be placed upon the natural support, and the whole matter fastened down by long green willow poles driven into the bottom of the lake. Instead of floating from place to place on the surface of the water, they are securely moored, and are really little stationary islands.

"This produce is brought to market by way of the Viga canal. The laden boats on their way towards the city make the whole length of the canal look bright and active. One boat carries lettuce, another scarlet tomatoes, a third corn and beans, others a brilliant load of flowers. The landing for the boats is a busy place, and reminds the visitor of places in Venice.

"In the afternoon many barges crowded with groups of handsome maidens and dark-eyed youths pass up and down this canal in gala dress, chanting plaintive melodies, and exchanging shy glances with friends and acquaintances."

When Miss Gray had finished, Mr. Cartmell gave a number of interesting facts about the great mining interests of the country: —

"From the mines of Mexico has come in the past a large part of the silver used in the world. To-day there are nearly three thousand mines in the republic. This belt of silver deposits extends from the southern part of the country to the most northern State. The richest mines are about one hundred and thirty miles north of the capital.

"Most of the mines are now owned and worked by large companies. Some of them yield a profit of a million dollars a year. One has a spiral path cut through the rock to the depth of five hundred feet, so that troops of mules can descend into the lowest part. The silver is generally found mixed with sulphur. The ore is often taken out on the backs of men, or in bags drawn up with ropes wound round a great drum turned by mules.

"Large lumps of native silver are sometimes found. One taken from the El Carmen mine weighed four hundred and twenty-five pounds, and was worth eight thousand dollars.

"One poor Mexican, named Flores, bought a small claim, and in a few days found on it a cavern; and from this silver cave he obtained over three million dollars.

"The miners try to steal and carry the ore away with them when they come out of the mines; they are therefore searched. Their methods of concealing it are quite artful. Sometimes they roll it up in cigarette papers, or put it in hollow handles to their hammers. They conceal it between their toes, in their ears and hair. Another way is to have it in little bags arranged with strings so they can be changed from side to side under their loose shirts when the keeper passes his hands over them trying to detect any such theft."

LESSON XXXVII.

THE CITY OF MEXICO.

MR. CARTMELL first entertained the club by telling what he had read in Mrs. Blake's book on Mexico. This writer says that the approach to the great city really begins twenty miles away. The country roads become broad avenues, winding through rows of cottonwoods; there are signs of more careful cultivation; water becomes more frequent; green meadows take the place of dusty plains.

The hedges dividing the different crops are composed of century-plants and other green shrubs. The valley takes many new shapes of loveliness. Tropical vegetation rises in the midst of strange woods. Dark-skinned, white-robed Mexicans pass along the roads, and beneath the shadows of soft-tinted mosques and towers.

From the hill to the north, on which stands the Castle of Chapultepec, the city of Mexico is best seen. The stately spires and domes glowing with varied color, white walls and arches mingling in the foreground, all surrounded with trees and gardens, remind the beholder of Florence.

Away towards the south rise in the background green hills, and beyond these the magnificent twin white-robed volcanoes, Popocatapetl (Smoking Mountain) and Iztaccihuatl (*ēs-tak-sēē-hwat'l*, the Woman in White).

The former lifts its cone far above the latter, and seems to keep careful watch over the motionless slumbers of his faithful wife.

POPOCATAPETL.

Florence then related what she had learned in her reading: —

"The streets of Mexico are always interesting, each turn revealing something strange and new. They are generally straight, wide, and lined with handsome houses. These houses are not usually over two stories high, and built invariably of stone in a massive style to withstand ordinary shocks of earthquake.

"The drives about the city are very beautiful. The most fashionable one is called the *Paseo*, one of the broad avenues leading from the Plaza to the Palace of Chapultepec, three miles distant. This hill was the imperial abode of Montezuma before Cortez came, and the residence of the unfortunate Emperor Maximilian till a short time

IZTACCIHUATL, MEXICO.

before his execution in 1867. It is now occupied by a military school, as it was when General Scott entered the city in 1848.

"Little balconies are connected with every house, and ornamented with iron carvings lighted up with gilding and bright coloring. They have large striped sunshades, or linen awnings, and blinds. Behind these partial protections the young ladies sit, and throw glances and smiles to their friends in the streets below. The houses have flat

roofs, like the houses in Cairo, Egypt. The streets cross one another at right angles from north to south and from east to west."

The next picture was one showing the great square, which George explained as follows: —

"Near the centre of the city is the 'Great Plaza,' turned by the Empress Carlotta from a heap of rubbish into a

THE PLAZA, OR SQUARE, MEXICO.

beautiful garden of trees, flowers, and fountains. The tall trees here shade marble walks, statues, and flowers.

"On the north side stands the great cathedral. The whole east side is occupied by the government buildings and President Diaz's house. The other sides are surrounded with shops, under which there is a constant clatter of buying and selling.

"All the streets seem to meet in and take their departure from this grand square. The great Aztec temple

of human sacrifice stood in this square when Cortez came in 1619. Hundreds of persons condemned to death have leaned against the stone railing about the fountain till the gentle splashing of its waters was drowned in the roar of the guns that put an end to their lives. Now the water-carriers, in their richly colored dresses, come here for the pure water."

THE CATHEDRAL IN MEXICO.

"George, what is the large building on the other side of the square?" Fred asked.

"That is the cathedral, — a very handsome building, with its two great towers and finely proportioned dome. It is said to occupy the site of the ancient palace of Montezuma. The interior of this cathedral, built in 1667, and often plundered, is even now magnificent. The high altar, once the richest in the world, is still very gorgeous, and the pulpits are made of greenish alabaster, carved

with figures of angels. It is one of the largest church edifices in the New World.

"Outside the sacred edifice are groups of Indians selling birds under the trees, and women with picturesque stands of cake and sweet drinks, the stands being prettily draped with flowers and reeds."

"On the northern side of the cathedral," said his father, "and leaning against the wall, is the celebrated calendar stone, which was dedicated to the sun, and once formed a part of the grand temple. There are figures and carvings upon the stone, telling the number of days in a year, and that four years make a period, and thirteen periods a Mexican age."

"The streets of Mexico," said Miss Gray, "are full of life and color. The variety of costumes to be seen at any time is wonderful. Some of the Mexican ladies now wear bonnets from Paris; but most of them still wear lace on the head, as they do in Spain, black mantillas, short skirts, and high-heeled shoes.

"The fruit-seller wears a blue-striped petticoat and a man's broad-brimmed straw hat, and carries a tray of tempting fruit, such as bananas, watermelons, oranges, mangoes, zapotes, strawberries, figs, pears, and apples."

Fred now wished to tell what he had learned, and Miss Gray gladly gave him a chance: —

"The water-carrier has a leather yoke and apron over his white shirt and blue trousers, his head is covered with a peaked leather cap, and he carries a large red earthen jar on his back and a smaller one hanging down between his hands.

"Among the most interesting peddlers are the bird-sellers, generally found in great numbers about the Plaza. They have mocking-birds, royal whistlers, cardinals, with

their brilliant red plumage, canaries with seven different colors, and cages of little humming-birds, lovely as the flowers at the bottom of the cage.

"In the evening other peddlers take the place of the above, and fill the air with their piercing cries. One calls out, 'Hot sausages!' Another repeats a long recitation, ending each time with 'Hot ducks, O my soul! Oh, hot ducks!'

"At ten o'clock in the evening the watchman puts down his lantern at the street corner, and blows a whistle shriller than words can describe, which is answered by all the other watchmen on his beat. This is repeated every quarter of an hour, and every hour during the night he calls the time and state of the weather."

Mrs. Cartmell had something to say about houses, horse-cars, and Sunday: —

"The houses in the country are usually plain, low, adobe structures, — that is, made of baked clay, — with simple pounded earthen floors. They generally have a court-yard in the centre, flat roofs, barred windows, and parapet walls.

"The Mexican house contains no stove, furnace, or fireplace, nor any means of warming the rooms, the owner looking upon artificial heat as very unhealthy.

"The bedsteads are either brass or iron, and quite narrow. Plenty of pillows are used, but springs are not common.

"Lace curtains adorn windows and every opening. Mirrors are placed over the sofa and on the opposite wall. The chairs are always placed around the sides of the room, or in a straight line down the middle. Books and pictures are rarely seen in the home.

"There is a good system of horse-cars in the city. The cars are first-class and second-class, and are drawn by mules. Each car has two conductors, one to sell the tickets and the other to collect them. The rules are not very strict, as live hogs are sometimes taken on board the second-class cars.

"Horses are cheap in this city, and everybody who can afford it owns a horse, and rides horseback. A Mexican on horseback is a gorgeous creature, with his broad-brimmed hat, — called a '*sombrero*,' — his leggings ornamented with silver braid and buttons, his massive spurs of silver, and richly embroidered jacket. His horse is, of course, gayly adorned with a handsome bridle and true Mexican saddle. Ladies are not often seen on horseback.

"Sunday is a great holiday. Everybody goes out in his best clothes. The military band plays in the Plaza, the shops are open, and the street peddlers do a large business. A bull-fight in the afternoon and a ball in the evening usually complete the day's enjoyment."

Mr. Cartmell at the end of the talk gave a few interesting facts about the drainage of Mexico: —

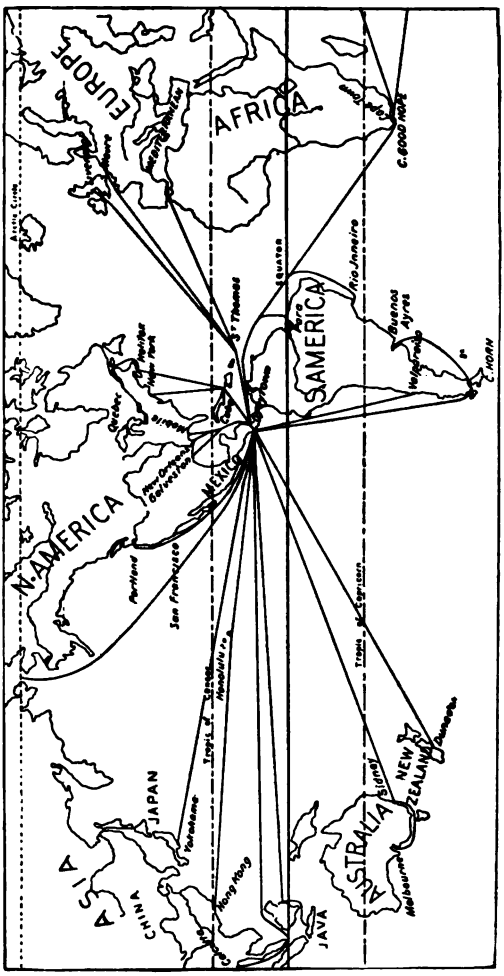
"If you look at the lower part of the diagram on page 286, you will see how completely the city of Mexico is surrounded by mountains. It is not only in a great valley-plain, but it is in the lowest part of this valley, near a lake which is but two feet lower than the city itself.

"Several times in the past the city has been inundated, or flooded with water. The last time the water did not subside for five years. Years ago there was considerable talk about moving the city to a higher part of the plain, but this has never been done, on account of the enormous cost.

"To prevent future floodings, the government in 1634 began to dig the great dike of Nochistongo, to carry off any unusual rise of the waters of the Quatitlan River that might increase the water in the lake near the city.

"This, the greatest earth-cutting in the world, is over twelve miles long, about two hundred feet deep, and its greatest breadth over three hundred and fifty feet. It required nearly two centuries to complete it. It resembles a great gorge among lofty mountains. The banks of the cutting are of the softest earth. The Mexican Central railroad line passes through the dike to the capital."

DIKE OF NOCHISTONGO, MEXICO.



THE NICARAGUA CANAL; OR, A HIGHWAY FOR THE COMMERCE OF THE WORLD.

LESSON XXXVIII.

A BROTHER'S LETTER.

"YESTERDAY," said Miss Gray, "I received a letter from my brother in **Central America**. You may enjoy hearing me read it": —

GREYTOWN, CENTRAL AMERICA, Nov. 12.

MY DEAR SISTER, — I arrived here safely, and am comfortably situated. I am well satisfied with my position as engineer in the Nicaragua Canal Construction Company.

I suppose the eyes of the commercial world are now turned towards this part of America, and especially to Greytown, where the **Interoceanic**, or **Nicaragua, Canal** begins its course. It will follow up the San Juan River for ten or twelve miles, then through a deep cut into Lake Nicaragua. To reach the level of the lake, it will be necessary to pass through three locks; to descend from the lake to the Pacific at Brito will require three more locks. The mountains are here much reduced in height, and broken by deep gulfs, plains, and valleys, as if so arranged on purpose for a canal.

To show the enormous saving in time and distance by this canal, I have drawn a rough sketch of a commercial map, a copy of which is enclosed. The route from New York to San Francisco will be shortened by forty-seven hundred miles, from San Francisco to Liverpool by seventy-five hundred miles, and in the same proportion on all other routes.

I have not time to tell you to-day how richly endowed this land is by Nature, and how sadly neglected by man. Sharks and alligators swarm in the water, snakes and legions of ants and scorpions in the grass, monkeys and iguanus in the trees. Forests of mahogany, cedar, and dyewoods abound, and furnish the chief exports.

I will give you more particulars in my next.

Your affectionate brother,

CHARLES.

LESSON XXXIX.

THE WEST INDIES.

"NELLIE, when you look at this map of the southern part of North America, what do you see?"

"I see, Papa, a **large number of islands.**"

"Are there any groups among them?"

"Yes, there seem to be three groups, — the first group of small islands near the United States, the second group of large islands farther away, and the third group of little islands farther south."

"Where are these islands located, Fred?"

"I should say between Florida and South America."

"What do they enclose, Florence?"

"The Gulf of Mexico and the Caribbean Sea."

"North and South America," said her father, "are connected by a solid isthmus to the west and by a broken isthmus towards the east, — broken up, perhaps, by the action of the sea.

"The whole area of these islands is estimated to equal twice that of New York State, but the population is a little less than the population of the Empire State. The comparative size of these islands is clearly shown in the chart now displayed by George.

"This great *archipelago* lies within the Torrid Zone, but the tropical heat is tempered by the cool breezes from the sea, and on many of the islands by the height of the

mountains. During the usual tropical rainy season, from May to November, the coast plains are very unhealthy, and the dreaded yellow fever is prevalent.

"The great heat causes terrible hurricanes, called cyclones, which blow with such violence that the strong-

COMPARATIVE SIZE OF DIFFERENT ISLANDS

est trees are uprooted, and at times whole cities are destroyed. Some of the islands are occasionally subjected to earthquakes."

George then threw upon the screen a fine view in Hayti.

The scenery there is very beautiful, as it is in all parts of the West Indies.

Miss Gray said: —

"I once travelled in the West Indies. I frequently went to walk or to ride in the early morning with a friend.

We rode out among the hills. The hills soon become mountains, the valleys growing deeper and deeper. The flowers, the trees, the birds, the insects, were a maze of perfume and loveliness. The picture we are now looking at is like many I saw in the different islands."

SCENE IN HAYTI.

"Here is another one, showing tropical vegetation," said George.

"In Hayti and in all these islands," continued Miss Gray, "tropical trees and plants grow in perfection, and nearly all the fruits and plants of temperate climes may be cultivated in the highlands. But the ignorance and laziness of the people and the wretched government hinder all progress. There is not a plough in Hayti, and the only steam-engine ever set up there was destroyed by the Spaniards in 1865. The splendid timber and other trees

TROPICAL VEGETATION.

of the vast forest are left to rot for want of a little enterprise."

"Which is the largest island, Fred?" inquired Mr. Cartmell.

"**Cuba.**"

"It is often called the 'Queen of the Antilles.' It abounds in beautiful views, both on the coast and in the interior. The sea continually runs up into the shore, forming lovely little lagoons and inlets, where the turtles hatch their young. An English poet says of Cuba, —

"'For thou art fairer than the evening air
Clad in the beauty of a thousand stars.'

"Columbus said of it, 'It is the most beautiful land that eyes ever beheld.'

"The hilly districts are extremely picturesque, in many places marvellously beautiful. Cuba is especially noted for the number of splendid bays and harbors it contains.

HAVANA.

Havana was long regarded as the finest bay in the world, and yet it is surpassed by Matanzas and several others."

"Miss Gray, can you tell us about the largest city in Cuba?"

"**Havana**, in the opinion of a noted English historian, is a grand, imposing city, such as might be compared for beauty with any in the world.

"In approaching the city, as I did, in a steamer, the traveller sees, not mountains and forests, but a series of undulating hills, cultivated with some care and sprinkled

with farmhouses. All the more imposing, therefore, are the walls and towers of the great Moro, the fortress which defends the entrance to the harbor. Ten miles off it is an imposing object. As one approaches nearer, it rises above him, stern, proud, and defiant. The city seen from this point is very attractive, with its domes and steeples and marble palaces, and its glimpses of long streets, handsome mansions, and cool arcades.

"Havana is about the size of New Orleans. It consists of the old town in the east and the new town in the west. The new town is more of a suburb than a business place. In it are situated the promenades, the finest private houses, cafés, theatres, and churches.

"The most noted thoroughfare in Havana is the Paseo de Isabel, which crosses the city from end to end, flanked by grand entrances. It has a double row of wide carriage-ways, ornamented with grand fountains and statues."

"I have read somewhere," Mr. Cartmell continued, "that in the northeastern part of Havana stands, facing an open square, a brown stone church, blackened by age, and dignified by the name of 'cathedral.' It is visited by every American, because within its walls lies buried all that remains of the great discoverer Columbus.

"Columbus was a great traveller while alive, and since his death his body has been buried at least four times. He was first buried in Valladolid, Spain, where he died in 1506. His remains were in 1513 transported to Seville, whence they were removed in 1536 to St. Domingo, Hayti, with those of his son Diego. But even here they were not allowed to rest; in 1796 they were brought to Havana."

Then Nellie inquired of her teacher about the people in Cuba.

"The people of Havana," replied Miss Gray, "are largely Spanish white people; we find very few negroes compared with the number seen in Kingston, Jamaica. Another peculiarity is that few women are seen on the streets except when going to church or riding in a carriage.

THE PROMENADE IN CUBA.

"These carriages are called '*volantes*.' They are somewhat like our victorias, — low-seated, and made to induce people to lean back in an indolent manner. The wheels are large, and placed so far apart there is little danger of overturning. The shafts are very long, and the horse is placed a good way from the carriage, so it is necessary for him to be ridden by a driver. This driver, a colored man, is dressed in gorgeous livery of scarlet, white, and gold or silver, with a large and gay pair of top-boots."

Miss Gray then called upon Fred to tell what he had learned.

"I have learned a few facts from two books in Father's library.

"In Cuba one eats when he is hungry. In his bedroom in the morning he drinks a cup of chocolate and eats a thin cake. After a few hours of business, when it begins to be hot, he goes home and enjoys a substantial breakfast. Dinner is eaten about five o'clock. The Cuban milk-wagon is the cow, which is driven to your house, and milked before your eyes, so you may be sure of the purity of the milk. The people partake, especially in the evening, of various kinds of cool drinks.

"There are not many railroads in Cuba. The favorite time to start on a train going to another town is at five o'clock in the morning. The cars are first, second, and third class, as in Europe. In place of a check for the baggage, a baggage ticket is purchased in addition to the regular ticket for the fare. On most of the railroads there is allowed as baggage one valise, one hat, and one game-cock.

"Sunday in Cuba is the great day for cock-fights, bull-fights, and balls. Both of these fights are under the care of the government, and carried on by gentlemen. The bull-fights are frequently attended by women and innocent children."

LANGUAGE LESSON.

Write a letter from Havana to your teacher, telling about the city and the people.

LESSON XL.

PRODUCTIONS OF THE WEST INDIES.

FLORENCE wished to know what the **productions** of the West Indies were, and her father told her: —

"The West Indies produce abundantly *sugar*, *tobacco*, *fruits*, and *spices*. For years the leading import of our own land has been sugar, nearly all of which comes from Cuba. It is shipped by steamers and other vessels from Havana, Cardenas, Matanzas, and other seaports to New York, Philadelphia, and Boston.

"The Cubans raise a sugar-cane which was brought from the South Sea Islands. It grows fully twelve feet high, the joints being longer, the stems stouter, and the leaves broader than those of other kinds. The deep, mellow loam of Cuba is well adapted to the growth of this cane.

"The sugar-cane is a kind of grass, which looks much like Indian corn when growing. It has a hard and solid stem, which grows in joints.

"As soon as the canes are ripe they are cut and taken to the mill to be ground. Every large sugar plantation has its own mill, where the canes are crushed by passing between large iron rollers, which squeeze out all the juice.

"The liquid is after a time boiled down in large copper pans until it is so thick that it will turn into sugar-crystals

as it cools. After this it is poured into great wooden coolers, in which it is allowed to cool very slowly. It is then put into hogsheads with holes in the bottom, from which the molasses is allowed to drip for five or six weeks, when the sugar is dry enough to be shipped to other

THE SUGAR-CANE.

countries. The sugar thus made is the common brown variety, sometimes called 'raw' sugar.

"In this state it is sent to New York and Boston, where it is refined in great refineries. This is done by melting it into syrup, and pouring the syrup through animal charcoal, which takes out the impurities and color. By another process of boiling it can be made perfectly white, and when drained in moulds it becomes loaf sugar."

Mrs. Cartmell asked Miss Gray if she visited Jamaica when in the West Indies. Miss Gray replied: —

"I spent a week there. Jamaica is the largest island belonging to England. It has a central chain of high mountains, called the Blue Mountains. It is well watered, has many good harbors and a fertile soil. This island sends us large quantities of oranges, bananas, and cocoa-nuts. It also raises several kinds of spices.

THE GINGER-PLANT.

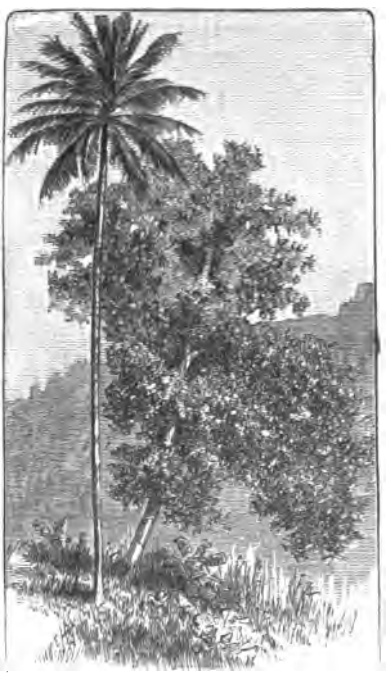
"Ginger is one kind of spice extensively cultivated in this island. The root, which is about as thick as a man's finger, is dug up when the stem of the plant withers. It is then scraped, washed, and dried. The young roots preserved in sugar syrup make a delicious sweetmeat. Jamaica ginger is considered the best in the world."

Florence was anxious to hear about the *tropical vegetation*. All turned to the teacher, who had been in that country, and she said: —

"A visitor from the North is delighted with the variety and beauty of plant-life, — great flowering trees, graceful palms, curious creeping vines, and delicate ferns.

"The cocoa-palms are seen everywhere. The boys climb the long, smooth trunks with the ease of a monkey, and select the ripe nuts, and throw them down. The milk is then clear like water, and very cool if one drinks it as soon as the fruit is picked.

"One of the most useful trees is the bread-fruit. The great balls of fruit vary from five to eight inches in diameter. Inside the hard shell is a thick flesh, like that of a melon. This is very nutritious, and the natives really live upon it; it is their daily bread. A tree bears for eight months of the year. The people do not need to work much when Nature does for them the threshing, grinding, and kneading, — everything but the baking.



COCOA-PALM AND BREAD-FRUIT.

"The pineapple-plant is very pretty. Its long, spear-like leaves, gracefully bending, exhibit a variety of shades in color from green to red. It grows to the height of two or three feet, and often spreads to a circumference of six feet or more."

"Are there any noted insects in the West Indies?"

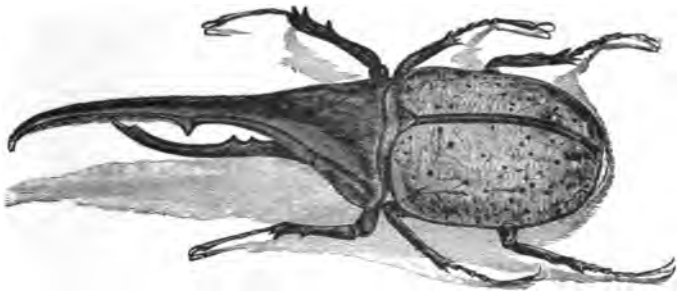
"Mr. Ober, the naturalist," George replied, "brought

PINEAPPLE.

home with him a bug which the natives call a razor-grinder, because it makes a buzzing noise as if grinding a knife or razor. It makes this noise when it cuts off small branches of trees. It is the largest known beetle in the world, being six and one quarter inches long. I have seen the specimen whose picture is now given."

Nellie wished to learn about the *children*, and Miss Gray, taking her up on her lap, related her experiences:

"There are plenty of children in the tropics. They are very pretty. Their brown skins seem to make up for the usual absence of clothing. They are not generally seen carrying home from school slates and books through the streets. When they first put on clothing, the results



HERCULES BEETLE, WEST INDIES.

are sometimes very grotesque and wonderful, as you may see by looking at the picture. But their eyes are very bright, and their digestion is always good. They go to school from seven to nine in the morning, and from four to six in the evening, because it is so hot at noon that they cannot study."

GROUP OF CHILDREN.

LESSON XLI.

THE QUEEN OF THE ANTILLES.

MARY B. CLARKE.

KNOWEST thou that isle of flowers,
Where the softest breezes blow,
And the Frost-king never spreadeth
O'er the earth his pall of snow?

Where, like gray old marble vases,
Crowned with feathery turfs of green,
Royal palm-trees rise majestic,
With the cocoas in between?

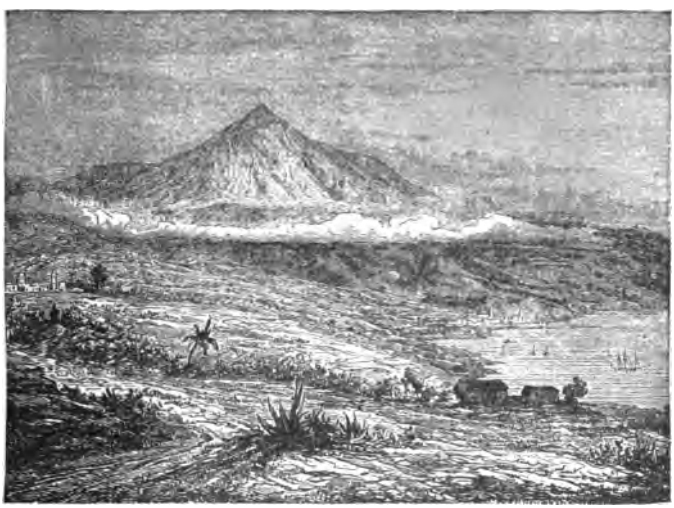
Where the purple-sheathed banana
Mingles with the sugar-cane,
And the fragrant coffee sheddeth
Scarlet berries on the plain?

Where the guava-apple ripens,
And zapotes, rough and brown,
With the mamey and the mango,
Cast their luscious sweetness down?

Where whole fields of ripening anas
With their fragrance load the breeze,
And the golden orange glistens
'Mid the blossoms on the trees,

And the ever-green pomegranate
Swings its coral flower-bells,
When its ruby grains are bursting
From their russet-colored shells?

'T is the Queen of the Antilles,
Seated on her emerald throne,
Crowned with ever-blooming flowers
And a beauty all her own.



A TROPICAL ISLE.

APPENDIX.

A SOLAR CAMERA.

HENRY R. RUSSELL, WOODBURY, N. J.

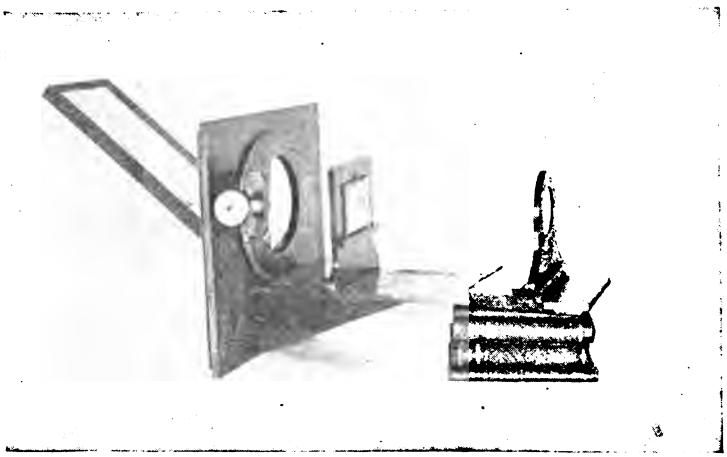


FIG. I.

THE "magic lantern" is no longer a mere toy; it is of great educational value in teaching geography, history, science, etc., and is becoming more and more valuable. And whatever is true of *it* in this respect is equally true of the Solar Camera. There are several good solar cameras in the market, but there are many schools unable to purchase one on account of the cost. It is the purpose of this article to show how an excellent one may be secured at small expense, — the cost of the materials and some careful

and profitable labor on the part of teacher and pupil being the only necessary outlay, as has been clearly demonstrated more than once.

The essential parts of a solar camera are (1) a *mirror*, to convert the sun's rays into a beam nearly or quite horizontal, and to direct it towards any point of the compass; (2) a *condensing lens*, to make the beam converge upon the "slide," or picture, to illuminate it;

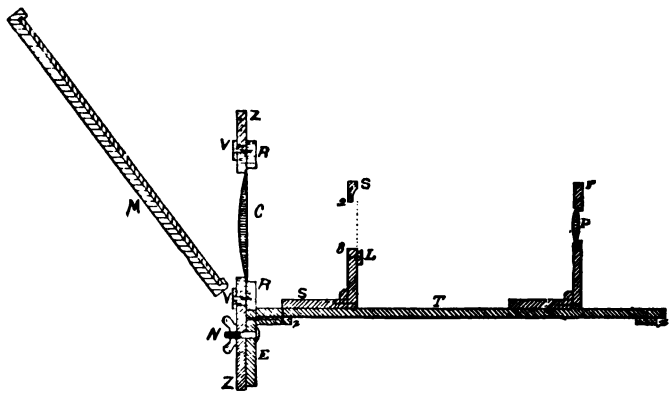


FIG. 2.

(3) a *projecting lens*, with which to throw an enlarged image of the slide upon a white wall or screen; and (4) some appliances for preserving the proper relation of these three parts to each other. The materials should all be *good*, and they may be bought for five dollars or less. The instrument herewith illustrated and described is, for simplicity of construction, easiness of manipulation, and efficiency in operation, about all one could ask for.

The mirror should be of French plate-glass, 6 inches by 18; the condensing lens a plano-convex or a bi-convex, 6 inches in diameter, with a focal length of from 15 inches to 20; and the projecting lens 2 inches in diameter, and of such focal length as will give the picture of the required size, — a lens of 12-inch focus enlarging a 3-inch picture to about 6 feet at the distance of 24 feet.

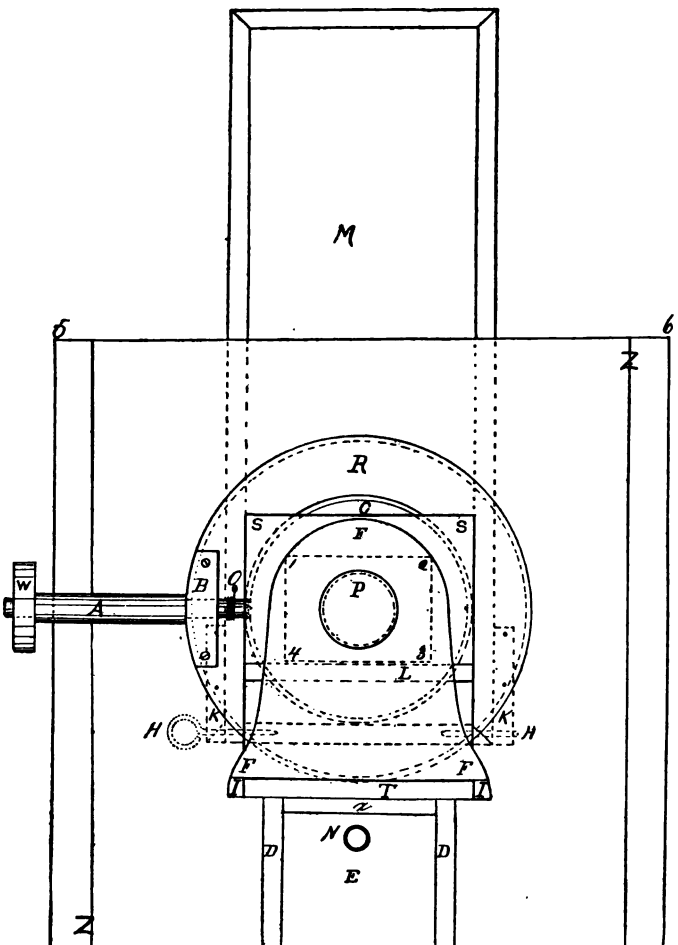


FIG. 3.

The wood-work may be made of thoroughly seasoned half-inch white pine, white-wood, or walnut, and the parts be fastened together with wood screws, wire brads, a thumb-screw, and glue to suit the maker's taste.

Its construction and operation will be readily understood by referring to the illustrations, in which Fig. 1 is a perspective view; Fig. 2 a vertical section through its optic axis; and Fig. 3 a front view, — the different parts, as they stand behind one another, being shown by dotted lines. As Fig. 3 is drawn to scale, dimensions not given may be obtained by measuring the cut.

The main frame, *Z Z*, is 16 inches long and 15 inches high, and it should be battened at the ends to keep it from warping. With a centre one inch above the centre of this frame, describe a circle 9 inches in diameter, and with a compass-saw or a scroll-saw cut out this portion; and if it is carefully done, the circular piece will serve to make the smaller portion of the ring *R*. This is made of two rings, one having each of its diameters three-eighths of an inch greater than the corresponding diameters of the other, so that when they are fastened together concentrically an inner rabbet is formed for the reception of the condensing lens, and an outer one to fit against the frame *Z Z*, *in* and *against* which it rotates, being held in place by the buttons *V V*, Fig. 2. The mirror *M* is attached by its lower end to the ring *R*, the pins *H H* passing through the ears *K K*, forming hinges. Around the inner end of the radial arm *A* is wound a strong cord or catgut, which passes through a hole *O* in the ring *R*, and is fastened by means of a hook to an eye in the frame of the mirror. Then with one hand on the wheel *W* of the radial arm, the ring may be turned, and the mirror raised or lowered, so that a beam of sunlight may be reflected in a horizontal or any required direction. The table *T*, about two feet long, having an L-piece *E*, and brackets *D D*, is strengthened by the battens *x x*, and is fastened to the frame by means of the thumb-screw *N*, dowels being also provided. The slide-support *S S* and the carrier *F F* of the projecting lens *P* may be readily moved back and forth upon this table, the strips *I I*

serving as guides. *L* is a shelf on the slide-holder *S S* upon which to stand the slides in front of the rectangular opening 1 2 3 4.

All the parts should be made to fit snugly, and the movable parts to move smoothly and easily. After this has been done, and sand-paper has been freely used, the whole wood-work should be treated to two or three coats of shellac varnish.

This camera may be used in any window in which the sun shines. Of course, some light is scattered in the room with the apparatus as here described; but it is not necessary to have the room very dark for ordinary projection with sunlight, and herein is one of the great advantages of the solar camera. Pictures will show *well* when the room is light enough for the pupils to see to take notes. In some *experiments* the room may be needed darker; in that case some wooden rods may be so placed that a black cloth spread over them will prevent the light from being dispersed in the room.

The construction of this camera is such that various "accessories" may be readily added, and its educational value be greatly increased; and there will hardly be any end to the pleasure and instruction it may be made to afford, and one sees in it hints of the service the photographic camera of the amateur may be made to render to the school.

When it is not in use as a camera, the mirror can be taken off and put away out of the dust, the projecting lens may be removed, and the slide-holder placed near the end of the table, and a good graphoscope will be provided for constant use, and ordinary photographs may be studied with increased interest and profit.

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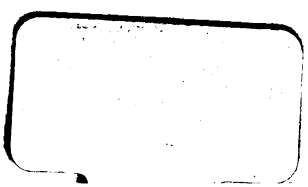
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